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WHOLESALE FOOD DISTRIBUTION FACILITIES FOR WICHITA, KANSAS

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PREFACE AND ACKNOWLEDGMENTS

This report describes wholesale food marketing facilities in Wichita, Kans., estimates the cost of handling food through these facilities, and presents plans for a modern, efficient food distribution center.

Grateful appreciation is extended to the wholesale firms in the Wichita area that cooperated in this study.

Appreciation is also extended to Jerry M. Mallot and Fred L. Wendt, of the Wichita Area Chamber of Commerce, for their help in coordinating this study and in collecting technical data; Edward J. Roberts, industrial development specialist with the city, for supplying site information; Paul B. Graves, traffic engineer with the city, for furnishing data helpful in our analysis of distribution costs; Dale B. King, member of Peat, Marwick, Mitchell & Co., for office space for U.S. Department of Agriculture personnel while in Wichita; and Kenneth H. Kitchen, executive director, Urban Renewal Agency, for supplying information on proposed renewal areas in Wichita.

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This study was conducted under the general supervision of Kenneth H. Brasfield, Chief, Food Distribution Research Laboratory, Agricultural Research Service.

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WHOLESALE FOOD DISTRIBUTION FACILITIES FOR WICHITA, KANSAS

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SUMMARY

In 1971, 49 independent and affiliated wholesale food firms were operating in the Wichita, Kans., area. Fourteen of them were operating in relatively poor facilities, based on a study of each firm's present location, condition and design of facilities, handling methods, and expansion potential. These 14 were considered as possible candidate firms for new wholesale food distribution facilities.

Twelve of the fourteen candidate firms received, handled, and distributed about 152,000 tons of food products in 1971. They employed over 600 persons and occupied almost one-half million square feet of floorspace. Fluid milk firms' volume and handling costs are excluded in this report, because their available volume data were not compatible with the data of other segments of the food industry and their operations were highly specialized.

The total selected costs of moving food products to, through, and from 12 of the 14 candidate firms totaled about $2.5 million or $16.36 per ton.

The proposed facilities described in this report are based on the 14 candidate firms. Facilities suggested for the proposed center include one multiple-occupancy building containing eight 30- by 100-foot units; eight single-occupancy buildings; one public refrigerated warehouse; one central refrigeration plant; direct rail access to the multiple-occupancy building, three single-occupancy buildings, and the public refrigerated warehouse; paved roadway 80 feet wide with lateral streets 50 feet wide; adequate parking areas for cars and trucks; and expansion areas for present facilities as well as land for the construction of additional facilities for allied industries. The proposed center would cost approximately $13 million.

Five representative sites were evaluated as possible locations for the proposed food distribution center. The center would require approximately 56 acres; 49 acres would be for the buildings and service facilities and the remaining 7 acres for other food firms or allied industries. Depending on the site selected, the estimated cost of the 49 acres would range from $146.9 thousand to $2.1 million. Thus, the estimated cost of land and facilities for the center would be between $13.1 and $15.1 million, depending on the choice of sites considered in this report.

The total selected annual costs to move products to, through, and from the new center would be affected by the method of financing new facilities and the choice of site. Assuming the use of industrial revenue bonds to finance the center, the total selected annual costs for 12 of the 14 candidates, excluding the 2 fluid milk firms, would be from $3.1 to $3.3 million or $20.47 to $21.46 per ton. The equivalent costs assuming private financing would range from $3.3 to $3.5 million or $21.94 to $23.17 per ton.

[1] Mr. Thompson has transferred to the Animal and Plant Health Inspection Service, U.S. Department of Agriculture, since the completion of this study.

INTRODUCTION

The Wichita Area Chamber of Commerce, with the concurrence of the city, the Metropolitan Area Planning Commission, the Wichita food industry, and other interested parties, requested the U.S. Department of Agriculture to make a comprehensive study of the wholesale food distribution facilities in Wichita. In September of 1971 the study was undertaken.

This study analyzed the wholesale food marketing system in the Wichita metropolitan area and determined whether the products handled by firms needing new facilities were of sufficient volume and variety to provide a nucleus for a new wholesale food distribution center. Cost data were collected on the existing operations and facilities, and the cost of developing a new food distribution center was estimated, including the amount of land required, types of facilities needed, and probable operating expenses.

The data relating to the amount of each commodity presently received by the wholesale firms and the present costs of handling the products from initial receipt through the various wholesale channels were obtained by personal interviews. These data were based on the calendar year 1971, the latest available at the time of this study.[2] Additional information needed to analyze the marketing system and to determine the need for a wholesale food distribution center was obtained from personnel of the city, county, and State governments and others connected with the wholesale food industry in the area.

This study includes 47 independent and 2 affiliated wholesale firms specializing in handling fresh fruit and vegetable, frozen food, grocery, meat and meat product, poultry and egg, and fluid milk products.[3]

Throughout this report, wholesale food firms are classified by the major food product they handle, i.e., if a firm's volume consists of 90 percent of fresh fruits and vegetables, 6 percent of groceries, and 4 percent of frozen food, it is considered a fresh fruit and vegetable firm.

Fluid milk firms' volume and handling costs are excluded in this report, because their available volume data were not compatible with the data of other segments of the food industry and their operations were highly specialized.

Excluded from this study are slaughtering plants, brokerage firms, and firms that wholesale less than 50 percent of their volume.

Because of the small number of wholesale firms in this study, volume and cost statistics are combined when appropriate to prevent disclosing confidential information.

The facilities and land presently owned and used by the firms needing new facilities have market value, and if sold they could help defray the cost of new facilities and land. This value, however, is not determined in this study and therefore is not considered in the costs presented here.

VOLUME OF FOOD HANDLED AND METHODS OF TRANSPORTATION

The total volume of direct and indirect receipts handled by 43 independent and affiliated wholesale firms was about 341,000 tons.[4] This included the tonnage of food moved through wholesale facilities but excluded the volume that bypassed them and was shipped directly to retailers and institutions from the producing areas. Direct receipts based on the volume of food received directly by the 43 firms from the food manufacturers or producing areas represented 335,500 tons, or 98.3 percent of the total

[2] Although the data on which this publication is based were collected during 1971, the findings are still valid and useful as guidelines for evaluating the need for improved food wholesaling facilities in Wichita.

[3] Wholesale food firms in Wichita were classified as either independent or affiliated. The independent ones were individual firms that had one or more wholesale facilities and sold directly to outlets they did not own or control. The affiliated firms included voluntary groups and retailer-owned warehouses that generally handled a complete line of food products and exercised some control over the operations of retail stores.

[4] Excluding 4 fluid milk processing plants and 2 dairy product distributors.

volume handled. Indirect receipts based on the volume of direct receipts rehandled within the study area represented 5,600 tons, or 1.7 percent of the total volume handled.

The total volume of receipts was unloaded at wholesale facilities, team tracks, or public warehouses. From initial points of receipts other than the wholesale facilities, these commodities were moved by trucks of the cartage or wholesale firms to the wholesale facilities.

Of the total 341,100 tons of food products handled by the 43 firms, 275,400 tons, or 81 percent, arrived by truck and the remaining 65,700 tons, or 19 percent, arrived by rail, including team tracks, house tracks, and piggyback.

PRESENT FOOD DISTRIBUTION FACILITIES

Wholesale food firms were located throughout most of the city when this study was made. There was some concentration of firms near the downtown area. The location of 49 firms conducting business in the city at that time is shown in figure 1.

Description

Fresh Fruits and Vegetables

Seven fresh fruit and vegetable wholesale firms operated in the Wichita area. Three owned their facilities and four rented or leased. Most were housed in multistory brick facilities of preWorld War II vintage. Two adjacent fresh fruit and vegetable firms in this type of facilities are shown in figure 2.

Six firms were located slightly east of the center city area in a section bounded on the north by Central Street, on the east by Wabash Street, on the south by Douglas Avenue, and on the west by Mead Street. House tracks were available at four firms and team tracks were within 1 mile for most firms. The total receipts by team tracks, however, were insignificant. Access to interstate highways and major arteries was sometimes difficult for many firms because of the occasional congestion in their immediate vicinity.

Refrigeration equipment within the wholesale facilities was generally adequate for the volume of food handled. No public refrigerated or nonrefrigerated warehousing was being used to any great extent.

Handling equipment consisted mainly of two-wheel handtrucks, two-wheel clamp trucks, four-wheel handtrucks, and manual pallet jacks. More sophisticated equipment was not being used because of the inadequate design of the wholesale facilities and the small volume handled by most of the firms.

Frozen Foods

There were truckbed-height loading docks at the facilities of both frozen food firms. Modern materials-handling equipment was used to move pallet loads of the products (fig. 3). Some traffic congestion was evident in the downtown location and parking areas were insufficient.

Refrigerated space was generally adequate, although some additional dry and cold storage space was rented by one firm from a local warehouse.

Groceries

Of the 10 grocery firms conducting business in the Wichita metropolitan area in 1971, 6 were concentrated in an area bounded on the north by Central Avenue, on the east by Wabash Street, on the south by Douglas Avenue, and on the west by Broadway Avenue. The others were scattered throughout the city. Most of these firms had good access to highways and had adequate parking and truck-maneuvering space with minimum congestion. Three of these firms had house tracks.

The buildings used by the grocery firms varied from modern single-level warehouses, which were designed for modern warehousing, to old multistory buildings built before the 1940's (fig. 4). Some smaller firms were using facilities that were designed as residences or retail stores (fig. 5).

Most firms had adequate refrigeration to handle their present volume, whereas a few were forced to maintain facilities in more than one location because of lack of space and expansion area.

FIGURE 1.—Location of 49 food firms in Wichita, Kans.

PN-4053

FIGURE 2.—Fresh fruit and vegetable wholesale facilities.

PN-4054

FIGURE 3.—Frozen foods received on pallets.

PN-4055

FIGURE 4.—Multistory grocery warehouse.

PN-4056

FIGURE 5.—Grocery facility converted from a retail store.

Handling practices also varied. Some firms made extensive use of forklift trucks, pallet racks, and mechanized selection equipment, whereas others handstacked merchandise on the floor and used freight elevators to move it from one floor to another.

Meat and Meat Products

The 14 meat wholesale firms in the metropolitan area were all within the city limits. Two of them were in the old downtown wholesaling area, seven blocks east of the new civic center, three were near the Union Stockyards on 21st Street, and the other nine were scattered throughout the city. None of these firms had direct access to interstate highways. The 14 firms received only a small amount of receipts by team track and piggyback. Three wholesale firms with good access to team tracks did not use them. Firms located away from the congested downtown area had little difficulty in making local deliveries.

Those firms in the old downtown wholesaling district and in the stockyards area experienced congestion at their loading docks, and parking space for their employees was insufficient.

Wholesale facilities ranged from modern one-story buildings (fig. 6) constructed specifically for handling meat products to old, inadequate facilities built during the 1930's for other uses. All the interiors of these older facilities had recently been remodeled to comply with the Wholesale Meat Act of 1967. This Act requires that all State-inspected facilities handling meat provide sanitary conditions at least equal to those for federally approved meat-handling installations. However, these alterations did not overcome the lack of space, which severely restricted efficient handling operations and

PN-4057

FIGURE 6.—Modern one-story wholesale meat facility.

hindered future growth potential for these firms. Also, some of these older buildings lacked dock platforms. Products had to be moved by hand or with outmoded equipment in some of the facilities.

Poultry and Eggs

At the time of this study, eight poultry and egg firms were operating in facilities ranging from old multistory buildings to relatively modern one-floor buildings designed specifically for food handling. All were within a 3-mile radius of downtown Wichita.

Several of the larger firms were near the center of town where they experienced traffic congestion, insufficient parking space for automobiles and trucks, poor access to expressways, inadequate expansion area, and relatively high rent.

None of the poultry firms did slaughtering, although some cut up and repackaged a sizable amount of the poultry handled. These operations were usually carried out within a small area of the facility.

All the wholesale firms had some refrigerated storage space, ranging from less than 100 to 7,000 square feet per facility. Three firms were forced to store products at a public cold storage warehouse because of lack of space and expansion area.

Three of the firms had truckbed-height receiving and shipping platforms, whereas five of them had no such platforms (fig. 7). Much of the product was handled manually or with two- or four-wheel handtrucks, either because the facilities were not designed for unitized materials-handling equipment or because the volume of product handled did not justify the purchase of such equipment.

Fluid Milk and Other Dairy Products

Four fluid milk processing plants and two dairy product distributors served the Wichita area. Three of the four fluid milk plants were near the central downtown area, whereas the other was in the northern part of the city. The milk plants near the central downtown area were primarily two-story brick and concrete structures with processing and handling operations on the first floor and offices and dry storage on the second floor. The plant located in the northern area of the city was a newer one-story brick and concrete facility with a retail operation at the front and processing operations at the rear.

The two dairy product distributors were in industrial areas—one in the southern and the other in the western part of the city. Except for the offices, their facilities were essentially docks used in transferring finishing products from large trucks to small trucks for local distribution.

All six firms had adequate parking. Most of them had good access to major streets and little or no problem with traffic congestion (fig. 8).

Affiliated Wholesale Firms

Two affiliated wholesale firms maintained complete warehouses in the Wichita area. Both had single-level buildings constructed of concrete and brick. They had good access to and from nearby highways and also were served by house tracks. Adequate areas for truck maneuvering and parking were available with minimum congestion.

PN-4058

FIGURE 7.—Poultry and egg facility with ground-level receiving and shipping area.

PN-4059

FIGURE 8.—Fluid milk facility.

Forklift trucks, pallet racks, and other modern handling equipment compatible with their warehouses were used, and refrigeration equipment was adequate.

Both companies conducted the bulk of their business out of their main warehouses; however, one firm maintained a cash-and-carry institutional grocery operation at another location, and in this report it is treated as a grocery firm.

Tenure Status and Space Utilization

Facilities are classified in this report as either primary or secondary. Primary facilities are those used for the daily operations. Additional or secondary facilities generally are for storage or manufacturing when the primary facilities are inadequate. If more than one facility was used, the tenure status of only the primary one was recorded. Space utilization included primary and secondary facilities.

Table 1 gives the tenure status and space utilization of 47 of the 49 firms. Of the 47 firms, 22 rented and 25 owned their facilities. Floorspace occupied in primary and secondary facilities totaled 918,200 square feet. Of this space, the percentage used by these firms was as follows: Fresh fruits and vegetables and frozen foods 8.9, groceries 32.9, meat and meat products 25.7, poultry and eggs 3.6, and fluid milk and other dairy products 28.9

EVALUATION OF PRESENT FACILITIES AND METHODS

Many of the wholesale food distribution facilities in the Wichita area were modern and efficient. Their costs of handling and marketing food reflected these efficiencies. In contrast, other wholesale facilities in the area were hampered by costly inefficiencies.

The designs of some wholesale food facilities were unsuitable for the operations performed in them. Some food firms lacked sufficient work, storage, and refrigeration space, which occasionally necessitated using secondary facilities.

Working conditions, such as lighting, ventilation, and sanitation, in some firms were poor. Several had attempted to improve employee working conditions and welfare facilities, which often depended on a firm's ability to make space available. Since some had insufficient space, facilities for employees were frequently inadequate.

Several firms combined processing operations

TABLE 1.—*Tenure status and space used by 47 independent wholesale food firms, Wichita* [1]

Independent wholesale food firms	Tenure status		Space [2] used for—					
	Rent	Own	Cooler	Freezer	Unrefrigerated sales and product storage	Office	Other purposes including processing	Total
	Number	*Number*	*100 sq ft*	*100 sq ft*	*100 sq ft*	*100 sq ft*	*100 sq ft*	*100 sq ft*
Fresh fruits and vegetables and frozen foods	4	5	23.7	9.0	38.7	3.8	6.3	81.5
Groceries	8	2	18.5	1.5	231.7	13.1	37.7	302.5
Meat and meat products	7	7	50.1	27.7	22.7	27.7	107.6	235.8
Poultry and eggs	3	5	6.1	1.9	16.4	3.6	5.4	33.4
Fluid milk and other dairy products	0	6	24.0	19.0	0	9.0	213.0	265.0
Total	22	25	122.4	59.1	309.5	57.2	370.0	918.2

[1] Data concerning fresh fruit and vegetable and frozen food firms are combined and information concerning 2 affiliated wholesalers is not included to avoid revealing confidential data.

[2] Includes space in secondary facilities.

in their facilities. Insufficient space, inability to meet code requirements, or both had caused some of them to abandon such operations.

The structural design of several facilities prohibited the use of proper materials-handling equipment. Firms with wood floors or variations in floor levels often were not able to use heavy equipment. Firms in buildings with low ceilings were prevented from high stacking of products and supplies. These factors resulted in using unskilled labor for tasks that could have been accomplished more efficiently with modern handling equipment.

The main floor of many facilities was crowded either because of poor layout or because the wholesale firm had outgrown its facility. To alleviate this problem, some firms used the basement or floors above the first-floor operating area. These levels often were served by inadequate stairways or slow freight elevators. Some firms had platforms of improper height to accommodate the vehicles using them. Others had no truck-level platform and had to load and unload at ground level.

To determine the need for improved facilities, the location, condition and design of facilities, handling methods, and expansion potential of the food firms were considered. Based on these criteria, 14 of the 49 independent and affiliated wholesale firms were considered as possible candidates for improved facilities (table 2).

TABLE 2.—*Candidate firms as proportion of all wholesale firms*

Wholesale food firms	Total firms	Candidate firms	Proportion of candidate firms
	Number	*Number*	*Percent*
Independent:			
Fresh fruits and vegetables	7	3	43
Frozen foods	2	1	50
Groceries	10	2	20
Meat and meat products	14	2	14
Poultry and eggs	8	3	37
Fluid milk and other dairy products	6	2	33
Total	47	13	28
Affiliated	2	1	50
Total independent and affiliated	49	14	29

These 14 candidate firms employed 621 persons and 7 of them used public warehouses. Their tenure status and the space they utilized were as follows:

Tenure status	*Number*
Renting	6
Owning	8
Total	14
Space occupied	*Sq ft*
Unrefrigerated sales and product storage	247,500
Refrigerated	77,800
Office	26,700
Other, including processing	98,000
Total	450,000

The volume of food handled, methods of receipt and delivery, and destination of product for 12 of the candidates, excluding the 2 fluid milk plants, were as follows:

Type of receipt	*Tons*
Direct	149,300
Indirect[1]	2,600
Total	151,900
Method of receipt	
Truck	119,200
Rail, including team tracks, house tracks, and piggyback	32,700
Total	151,900
Method of delivery[2]	
By wholesaler	126,600
Picked up by customer	2,700
By cartage firm	22,600
Total	151,900
Destination of product[2]	
Metropolitan area	79,200
Outside metropolitan area but within State	55,700
Outside State	17,000
Total	151,900

[1] Includes receipts from other wholesalers in metropolitan area.

[2] Includes distribution to other wholesalers.

COSTS IN PRESENT FACILITIES

The estimated costs experienced by 12 of the 14 candidate firms to move their products to, through, and from present wholesale facilities are shown in table 3. The costs of the two candidate fluid milk firms are not included in this analysis because their operations were highly specialized.

The cost of moving commodities from the points of initial receipt to the firms' facilities, including cartage and avoidable delays, totaled $4,400 or $0.03 per ton of the total volume handled.

Cartage cost consisted of loading commodities into trucks from commercial warehouses and transporting them to the firms' facilities.

Avoidable delay consisted of the actual delay time by wholesalers' trucks in delivering commodities at their facility.

Transportation cost for direct receipts without cartage, except for avoidable delay, was not included in this report.

Labor cost at the facilities consisted of the expense of unloading trucks and railcars, handling within the facilities, and loading trucks. This totaled $1,192,100 or $7.85 per ton.

Cost of unloading incoming vehicles consisted of the labor cost for moving products from truck or house tracks to their storage location in the facility.

Handling cost within the facility consisted of the labor cost of order assembly and rehandling.

Cost of truck loading consisted of labor cost for moving products from the order assembly area into the delivery trucks. If truck drivers assisted in the loading, their labor was included as part of the loading cost.

"Other costs" associated with the facilities consisted of the cost of rent, public storage, ownership and operation of handling equipment, and waste, shrinkage, deterioration, and pilferage. The cost of these items totaled about $687,200 or about $4.52 per ton.

Facility rental cost consisted of the annual rent paid by the wholesalers for the use of their facilities, real estate taxes, facility maintenance and repairs including refrigeration, fire and extended insurance on building but not contents, security services, and snow removal. For wholesaler-owned facilities, the annual rental value of their facilities was estimated by the owners.

Insufficient space and occasional large purchases caused some wholesalers to use public

storage warehouses. The cost of storage in public warehouses was determined by wholesalers' estimates.

Handling equipment cost consisted of the annual ownership and operating expenses of the equipment exclusive of labor used in facility handling operations.

Waste, shrinkage, deterioration, and pilferage consisted of the value of products lost in wholesaling operations. The reduction in value of salvage products was included as part of the deterioration cost.

Facility-related cost, such as fire and extended insurance on contents, personal liability, electricity, garbage and trash collection, and extermination, was not included in this study because of the difficulty in making valid comparisons between 1971 and proposed costs.

The distribution cost of moving food products to the five metropolitan areas was $602,000 or $7.69 per ton. Included was the cost for vehicle ownership and operation, unloading at destination, and drivers' time.

The total selected costs of moving food products to, through, and from 12 candidate firms totaled $2,485,700 or $16.36 per ton.

The cost of customer pickup and distribution outside the area was beyond the scope of this study.

Appendix I gives a detailed explanation of how all these costs were derived.

TABLE 3.—*Selected costs of moving food products to, through, and from present wholesale facilities of 12 candidate firms*[1]

Movement of commodities	Volume [2]	Annual cost [2]	Cost per ton [3]
	1,000 tons	*1,000 dollars*	*Dollars*
To facilities:			
Direct receipts from warehouses with cartage [4]	0.3	1.3	4.67
Direct receipts without cartage [5]	149.0	0	0
Indirect receipts without cartage [6]	2.6	0	0
Avoidable delay at facilities [7]	(151.9)	3.1	.02
Total or weighted average	151.9	4.4	.03
Through facilities:			
Labor:			
Unloading	(151.9)	360.9	2.38
Handling within	(151.9)	613.6	4.04
Loading out	(151.9)	217.6	1.43
Subtotal	(151.9)	1,192.1	7.85
Other costs:			
Rent [8]	(151.9)	329.3	2.17
Public storage	(151.9)	114.9	.76
Equipment	(151.9)	89.9	59
Waste, shrinkage, deterioration	(151.9)	136.8	.90
Pilferage	(151.9)	16.3	.11
Subtotal or weighted average	(151.9)	687.2	4.52
Total or weighted average	151.9	1,879.3	12.37

See footnotes at end of table.

TABLE 3.—*Selected costs of moving food products to, through, and from present wholesale facilities of 12 candidate firms*[1]—Con.

Movement of commodities	Volume [2]	Annual cost [2]	Cost per ton [3]
	1,000 tons	*1,000 dollars*	*Dollars*
From facilities:			
On wholesalers' trucks to—			
Metropolitan area: [9]			
Central	9.2	99.8	10.85
Northeast	10.3	93.8	9.11
Southeast	19.8	150.6	7.61
Southwest	22.5	140.6	6.25
Northwest	16.5	117.2	7.10
Subtotal or weighted average	78.3	602.0	7.69
Outside metropolitan area [10]	71.8	----	----
Picked up by customer [10]	1.8	----	----
Total or weighted average	151.9	602.0	3.96
Grand total or weighted average	151.9	2,485.7	16.36

[1] Costs of 2 fluid milk processing plants not included in this study.
[2] Rounded to nearest 100.
[3] Based on annual cost divided by volume.
[4] Negligible receipts by way of railroad team tracks and airports.
[5] Considered as part of total shipping cost.
[6] Comprised of receipts from other wholesalers in metropolitan area. This cost is allocated to wholesalers from whom receipts originated and therefore is costed out as their distribution under section "From facilities."
[7] Cost per ton based on total volume.
[8] Includes cost of refrigeration.
[9] Includes distribution to other wholesalers.
[10] Cost data not available.

Note: Items in parentheses are not included in totals because they are part of other items.

PLANNING NEW WHOLESALE FOOD DISTRIBUTION FACILITIES

The need for new buildings for the candidate firms can best be met by constructing a wholesale food distribution center that is organized, planned, and designed specifically for the handling of food. The common need of the candidate firms for land, central energy, direct rail service, and good access to highways can be satisfied by such a consolidated center.

When planning a wholesale food distribution center, several factors should be considered. They are design, technology, arrangement, location, cost, management, and auxiliary facilities.

The buildings must be designed to meet the requirements of each type of wholesale firm. They should provide ample space for unloading, processing, storage, sales, assembly, and loading.

Since technology is changing in the food industry, each type of wholesale unit should be simple and functionally designed so that it can be modified to meet future needs.

In developing a wholesale food distribution center, the facilities on the site should be so arranged that the marketing functions are efficiently performed. Wholesale firms of the same

commodity should be grouped together. Firms having a shopping trade should be where the traffic generated by their operations would least interfere with other market traffic flow.

Such service facilities as a public refrigerated warehouse and a central refrigeration plant should be located where they can conveniently serve the entire market.

When selecting a site for a food center, its accessibility by rail and major highways should be considered. In addition, it should be near enough to the center of distribution to minimize delivery costs.

In appraising the cost of land for a food center, its purchase price and the expense of preparing it for use must be considered. Sufficient land must be allocated for future expansion.

Sound management is essential to efficient operation of a food center. The management should have the authority to see that health, traffic, and policing regulations are enforced. However, firms should be allowed the maximum degree of individuality within the framework of good business practices.

In addition to the wholesale food center, such auxiliary facilities as restaurants, public restrooms, trash-disposal units, and service stations for motor vehicles could be included. Additional space could be provided for banks, brokers' offices, market management, inspection service, barber shops, and other supplementary organizations or related industries interested in locating in the center. Adequate parking space must be provided.

PROPOSED FACILITIES FOR A WHOLESALE FOOD DISTRIBUTION CENTER

The facilities described here are based on the 14 candidate firms, their volume of food handled in 1971, and their turnover rate. In addition, space has been provided for future expansion. The actual number of facilities constructed should be based on the space required by tenants who sign firm leases. Care should be taken to insure a high rate of occupancy because overbuilding can cause developers to incur the cost of unused facilities.

Two types of buildings are needed—a multiple-occupancy building for small-volume wholesale firms and single-occupancy buildings for large-volume firms. For this study, tilt-up concrete construction was used to estimate the building construction costs. This type of construction was selected only as a basis for estimating, and it is not intended to exemplify the best or most effective material or method of construction in Wichita.

A multiple-occupancy building consists of a row of store units for individual firms. Each unit contains a first floor and a mezzanine. These units are of standard size, 30 by 100 feet, and designed so that a single unit will meet the needs of a small firm and some multiple of this will meet the needs of larger firms. Such a building provides the advantages of economic construction while meeting the demand for a multiuse facility to handle food commodities. Removable partitions are recommended between units.

Firms needing more than five units and those requiring specialized facilities usually can be accommodated more satisfactorily in single-occupancy buildings designed for their specified needs. The square footage of the single-occupancy buildings is provided in the master plan. The specific design of these buildings is left to the individual tenant's requirements.

Table 4 gives the type and number of firms and facilities needed for the proposed wholesale food distribution center.

The following facilities are included in the proposed plan:

(1) One multiple-occupancy building containing eight 30- by 100-foot units, including a restaurant in one unit.

(2) Eight single-occupancy buildings.

(3) One public refrigerated warehouse.

(4) One central refrigeration plant.

(5) Direct rail access to one multi-occupancy, three single-occupancy buildings, and one public refrigerated warehouse.

(6) Paved roadway 80 feet wide with lateral streets 50 feet wide.

(7) Adequate parking for cars and trucks.

(8) Expansion areas for present facilities as well as land for construction of additional facilities for allied industries.

TABLE 4.—*Type and number of firms and facilities required for proposed wholesale food distribution center*

Wholesale food firms	Candidates	Multiple-occupancy building units	Single-occupancy buildings
	Number	*Number*	*Number*
Fresh fruits and vegetables	3	3	0
Frozen foods	1	2	0
Groceries	2	0	2
Meat and meat products	2	0	2
Poultry and eggs	3	2	1
Fluid milk and dairy products	2	0	2
Affiliated	1	0	1
Total	14	7	8

Multiple-Occupancy Building

The recommended multiple-occupancy building is 240 feet long, 100 feet deep, and is completely enclosed. The building is supported by columns and steel trusses spaced on 30-foot centers and may be divided into 30-foot-wide units by waterproof partitions. These partitions may be removed if a wholesaler needs additional units. The indoor area has a clear ceiling height of about 25 feet between trusses except where mezzanines are located. Figure 9 shows a section view of the basic type of unit recommended for a multiple-occupancy building.

The floor at the front of the unit, or loading area, is 45 inches high and the floor at the rear is 55 inches high to allow for receipt of products from refrigerated railcars. The front and rear of the units should be protected by vertical rubber bumper strips, except where dock seals are used, to prevent damage by motor vehicles. The mezzanine extends 6 feet beyond the front of the unit. The front of the unit is used to receive products by truck and to load out, and the rear is used to receive products by truck and railcar. The tracks should be recessed in the pavement to permit access by trucks and to facilitate cleaning operations.

The main floors should be of reinforced concrete with a nonskid surface and have a minimum of 1/8-inch slope toward drains. They should be capable of supporting a live load of 400 pounds per square foot. Freezer floors require subslab preparation or a crawl space to prevent frost heaving, which is caused by ice formation below the floor. Heaving can be prevented by adding heat to the soil or fill material beneath the floor insulation. Air ducts, electric heating elements, or pipes through which a nonfreezing liquid is recirculated can be used for this purpose.

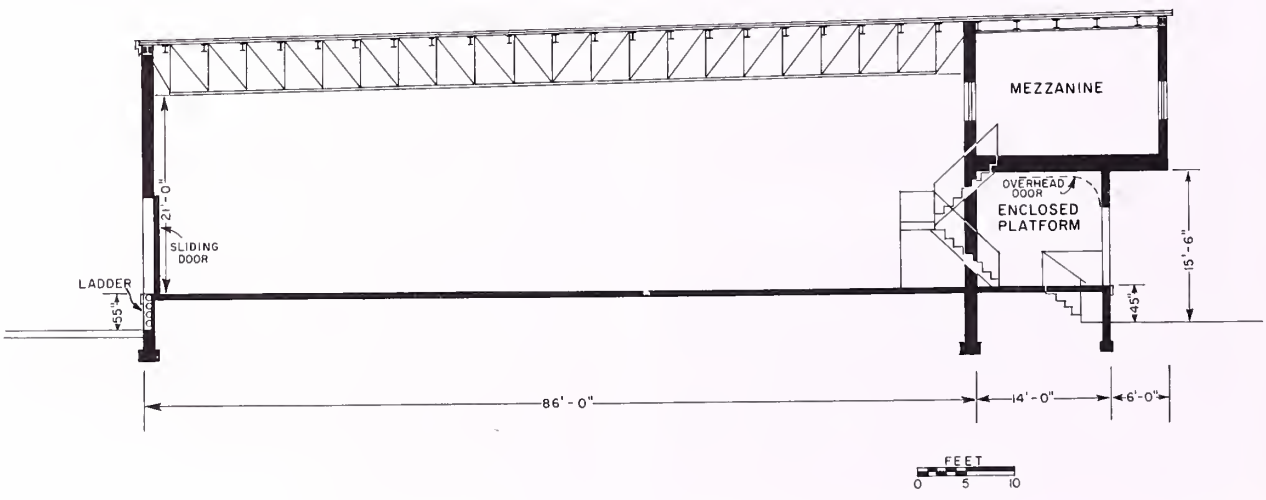

FIGURE 9.—Section view of a multiple-occupancy building unit.

A 20-foot-deep mezzanine with a floorline load capacity of 125 pounds per square foot extends the entire width of the front of the building. The mezzanine can be used for offices and welfare facilities. Figure 10 shows an artist's conception of an enclosed front platform of a multiple-occupancy building.

Single-Occupancy Buildings

The eight single-occupancy buildings range in area from 13,920 to 170,900 square feet. Firms with a large volume or with a specialized operation requiring a large amount of floorspace are best accommodated in single-occupancy buildings, which are designed to the specification of the individual tenant. Figure 11 shows an artist's conception of two single-occupancy buildings.

Description of Proposed Wholesale Food Facilities

Fresh Fruits and Vegetables

The three fresh fruit and vegetable firms require three units in the multiple-occupancy building containing a total of 9,000 square feet of first-floor area. Figure 12 shows a suggested layout of a totally enclosed fresh fruit and vegetable unit in a multiple-occupancy building. Each unit contains 3,000 square feet of interior first-floor area. All units will have a mezzanine with an additional 600 square feet.

In the suggested units the first-floor interior of the facility is divided into three sections—cooler, nonrefrigerated storage area, and order assembly and display area. Three rows of pallet racks stacked three high are along one side of

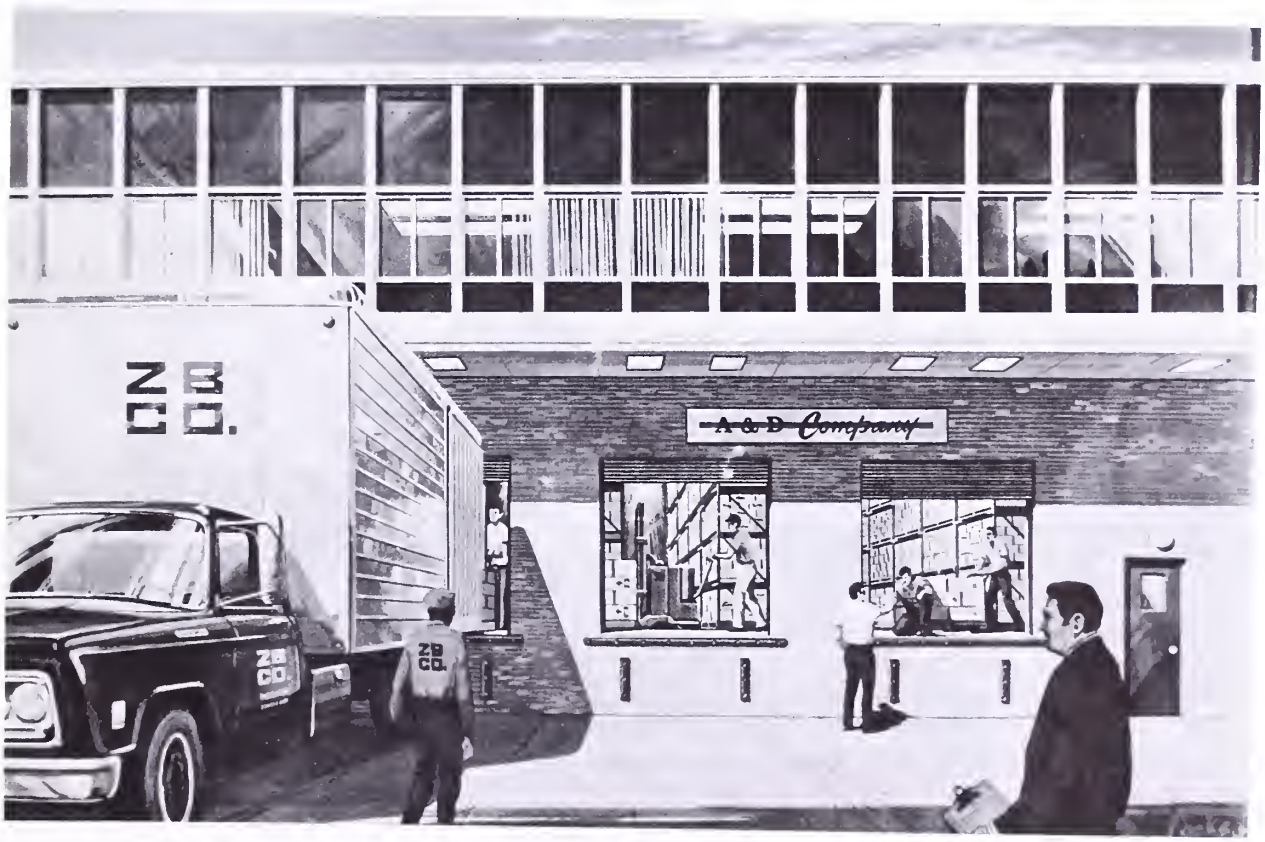

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FIGURE 10.—Artist's conception of an enclosed front platform of a multiple-occupancy building.

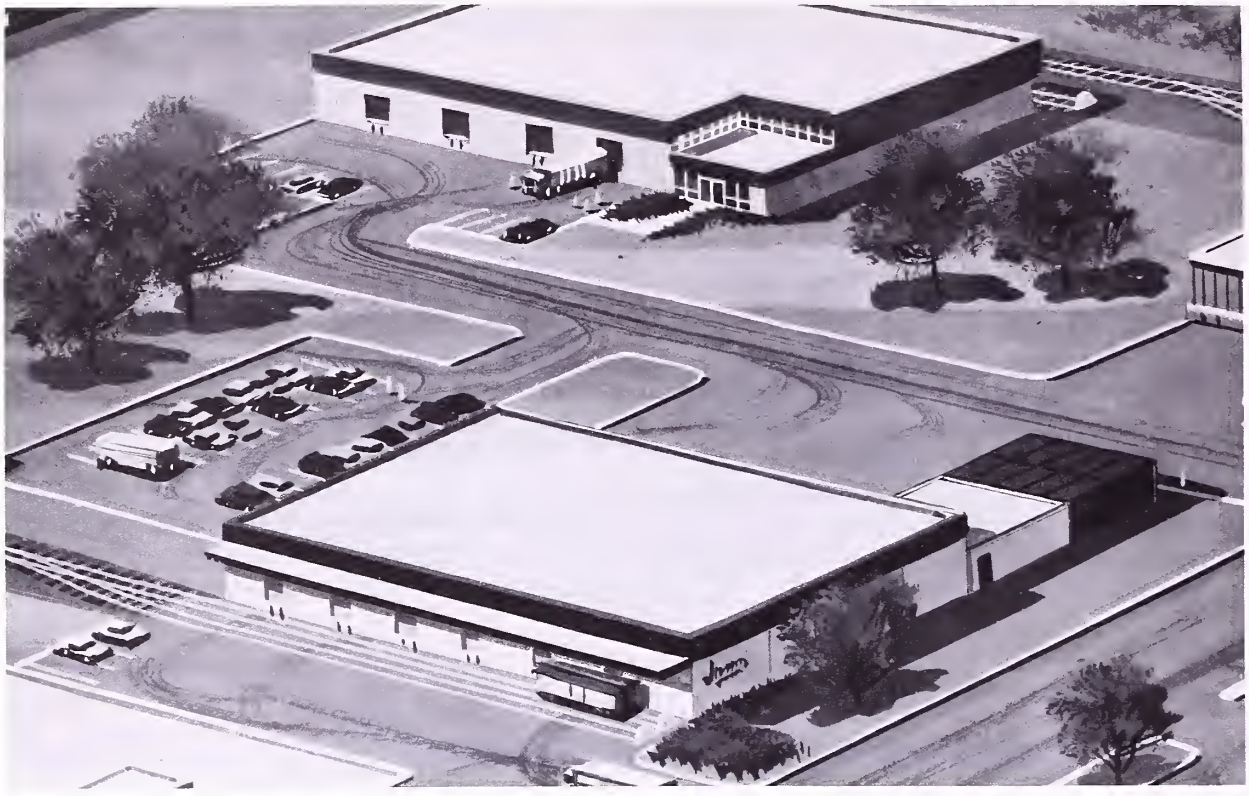

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FIGURE 11.—Artist's conception of two single-occupancy buildings.

the cooler and two rows on the opposite side. The nonrefrigerated storage area has a pallet-rack arrangement similar to that in the cooler area. The front of each unit contains space for order assembly and displaying products.

Two overhead doors provide access to the interior of the unit. The unit has an access door for pedestrians at street level. This door opens to stairs leading to the first floor and mezzanine. The rear of the unit has a horizontal sliding door 55 inches from the top of the rails to allow unloading of refrigerated railcars.

Frozen Foods

One frozen food firm would require two units in a multiple-occupancy building. Figure 13 shows a layout of the interior of a single unit designed for a typical wholesaler handling this commodity. The front of the unit, or order assembly area, would be used for temporary storage of assembled orders for checking.

Groceries

The two grocery firms require two single-occupancy buildings totaling 58,500 square feet of first-floor area. Each building is served by two sets of house tracks with switches for use by each firm. Adequate parking and outside lighting are provided on the premises.

Meat and Meat Products

The two meat and meat product firms require two single-occupancy buildings totaling 33,225 square feet of first-floor area. Figure 14 shows an artist's conception of the interior facilities of a wholesale meat firm.

Requirements for the construction of these buildings are fully described in guidelines published by the Meat and Poultry Inspection Branch of the Animal and Plant Health Inspec-

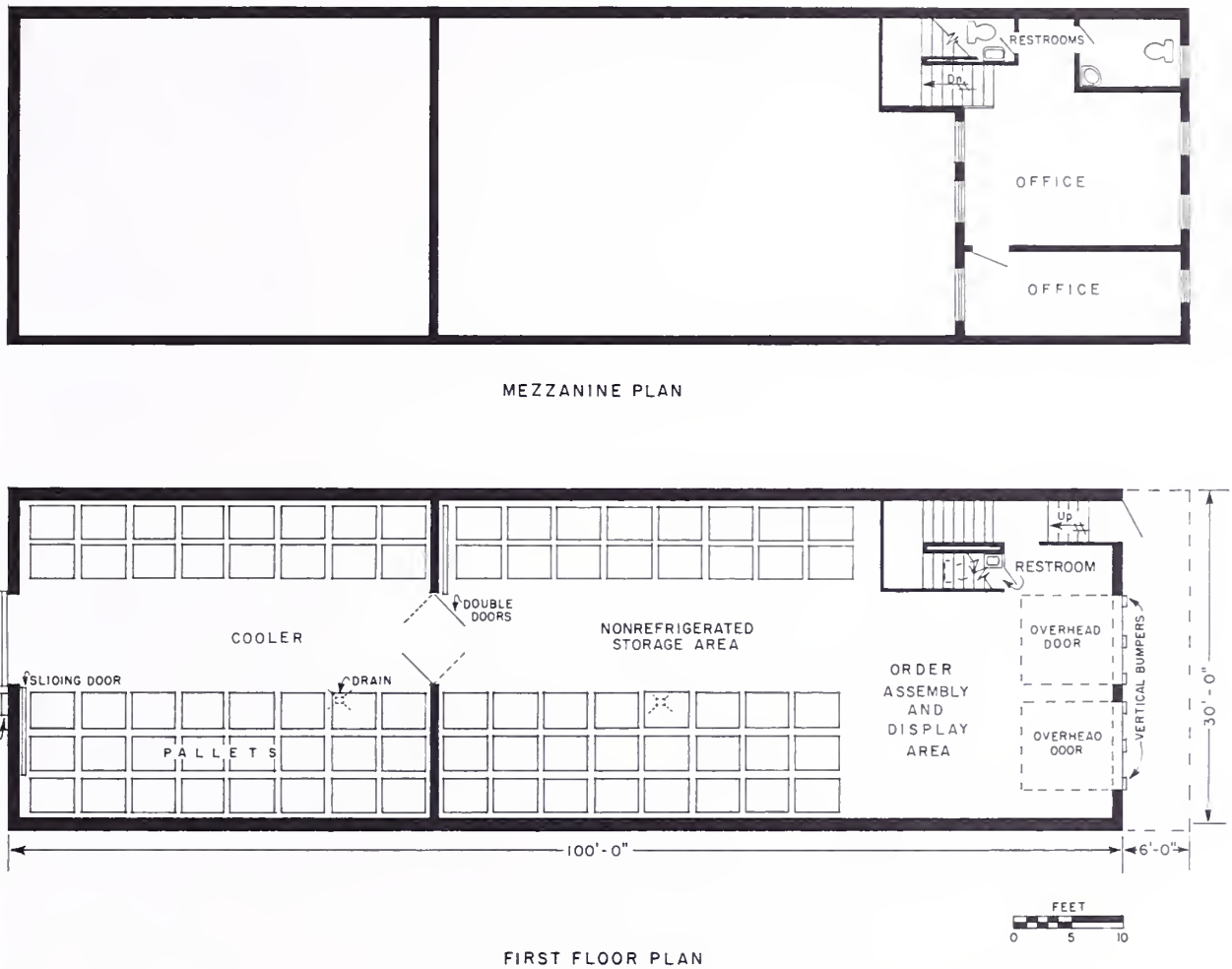

FIGURE 12.—Layout of a fresh fruit and vegetable firm in a multiple-occupancy building unit.

tion Service.[5] Particular attention is directed to floor drains and grease traps, lighting, floors, wall and ceiling materials and finishes, and plumbing fixtures.

Meat rails should be supported from the first floor on steel columns—not suspended from the second floor. The second floor could be used for light dry storage. Present shifts from shipments of carcass meat to boxed meat could eventually eliminate the need for conventional meat rails. Therefore the second floor should be constructed so that all or part of it can be removed without damaging the basic building. Such flexibility in the proposed facility design can satisfy both present and future needs for handling meat products.

Poultry and Eggs

One of the three poultry and egg firms would require a single-occupancy building with 15,000 square feet of first-floor space. The remaining two firms would each require one unit in a multiple-occupancy building. Figures 15 and 16 show typical layouts for poultry and egg units.

The standard 600-square-foot mezzanine in the poultry unit has been expanded by 600 square feet to provide a total floor area of 4,200 square feet for the entire unit (3,000 square feet of floorspace on the first floor plus 1,200 square feet of floorspace on the mezzanine). On the first floor three rows of pallet racks are placed along both sides of the cooler providing 39

[5] U.S. DEPARTMENT OF AGRICULTURE. U.S. INSPECTED MEAT PACKING PLANTS—A GUIDE TO CONSTRUCTION, EQUIPMENT, LAYOUT. U.S. Dept. Agr. Agr. Handb. 191, 73 pp. 1969.

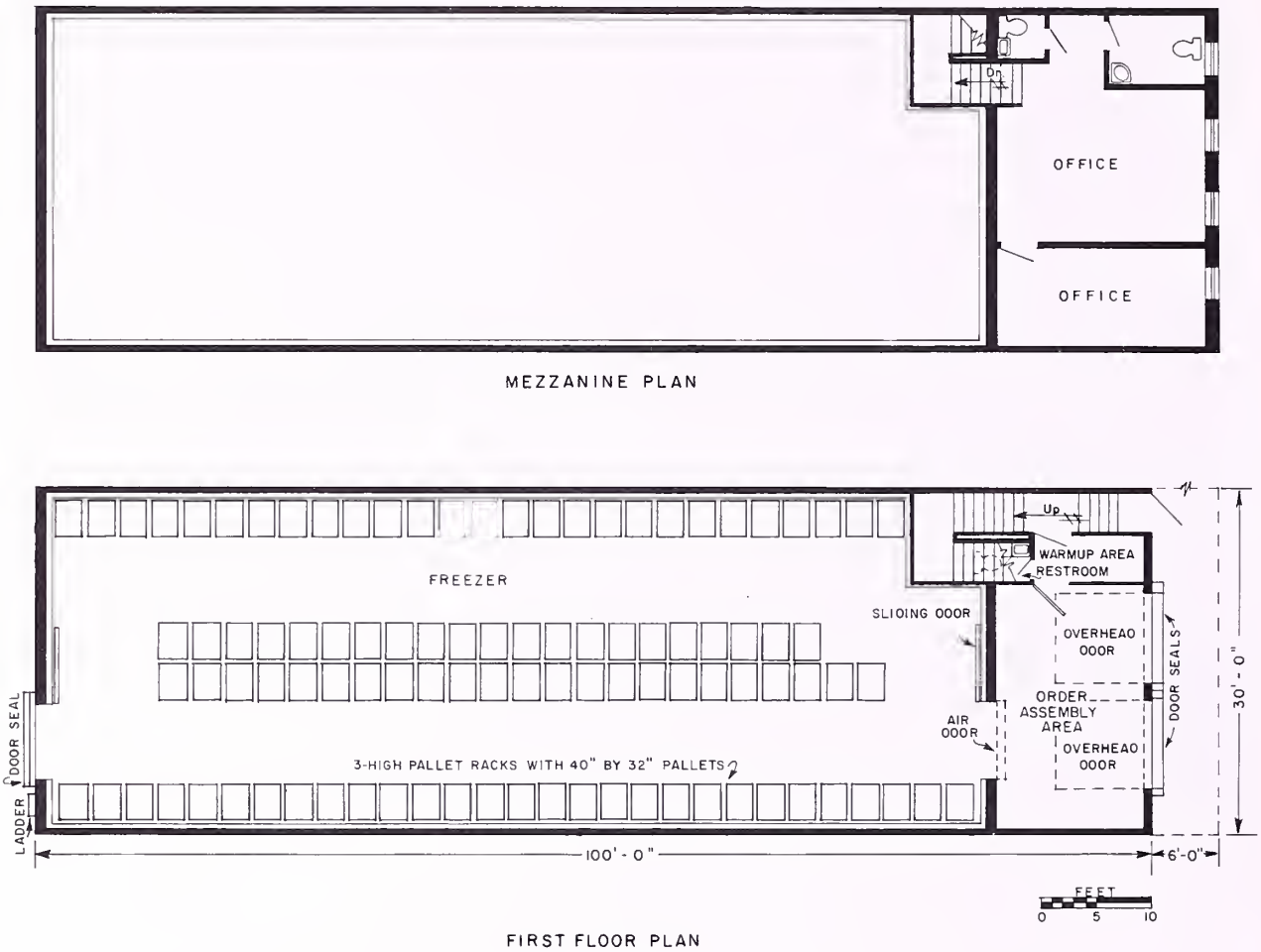

FIGURE 13.—Layout of a frozen food firm in a multiple-occupancy building unit.

pallet slots. Icepacked poultry is assumed to be stored only one pallet high to prevent dripping problems. If the poultry is chillpacked, however, high stacking may be considered. A small freezer with shelves is included in the poultry layout. Where necessary, air doors or fans should be provided to prevent insects from entering the processing and order assembly areas. In the processing room the doors and walls must be impervious to water to a height of 6 feet above the floor. Details of the poultry facility must comply with USDA regulations for the inspection of poultry and poultry products.[6]

[6] U.S. DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICE. POULTRY INSPECTION. *In* Meat and Poultry Inspection Regulations, pp. 1-121. Washington, D.C. 1973.

In the egg unit (fig. 16), three rows of three-high pallet racks are along both sides of the cooler. This unit has a combined processing and assembly area.

The sales office of both units has glass panes in three walls to permit monitoring of the various operations. On the mezzanine of both units are a general office, a private office, two restrooms, a welfare room, and storage space.

All floor drains are vented and have deep seal traps. Grease traps are necessary in the poultry unit. Restroom soil lines are separate from the floor drainage system to a point outside the building.

Fluid Milk and Other Dairy Products

The two fluid milk and dairy products whole-

sale firms require two single-occupancy buildings containing a total of 48,920 square feet of first-floor area. Paved parking areas and outside lighting are provided on the site.

Affiliated Wholesale Firm

The affiliated firm requires one single-occupancy building containing 170,900 square feet of first-floor space. The refrigerated areas within the building are all designed as freezer space to allow for conversion of coolers to freezers at a later date. The building is served by two sets of house tracks, which are in an enclosed area that separates the dry storage and refrigerated sections of the building. Adequate parking and outside lighting are provided.

Public Refrigerated Warehouse

The one-story public refrigerated warehouse contains 46,225 square feet with a clear ceiling height of 22 feet, totaling about 1 million cubic feet of refrigerated storage space. This facility should have a 32° F cooler, a 10° freezer, and a −40° blast freezer. The front and rear platforms should be enclosed and insulated. A mezzanine above the front platform could be used for office space.

Central Refrigeration Plant

A study of refrigeration systems for food distribution centers[7] concluded that a centralized system used by several firms can reduce refrigeration costs considerably when compared with the costs of individual systems for each firm. Since the individual systems could cost over 4 percent more to install and almost 62 percent more per year to own and operate, a central refrigeration system is recommended.

The total system consists of a central plant

[7] STAHLMAN, R. L. A STUDY OF REFRIGERATION SYSTEMS FOR URBAN FOOD DISTRIBUTION CENTERS. U.S. Dept. Agr. Agr. Mktg. Res. Rpt. 921, 107 pp. 1972.

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FIGURE 14.—Artist's conception of a wholesale meat and meat products facility.

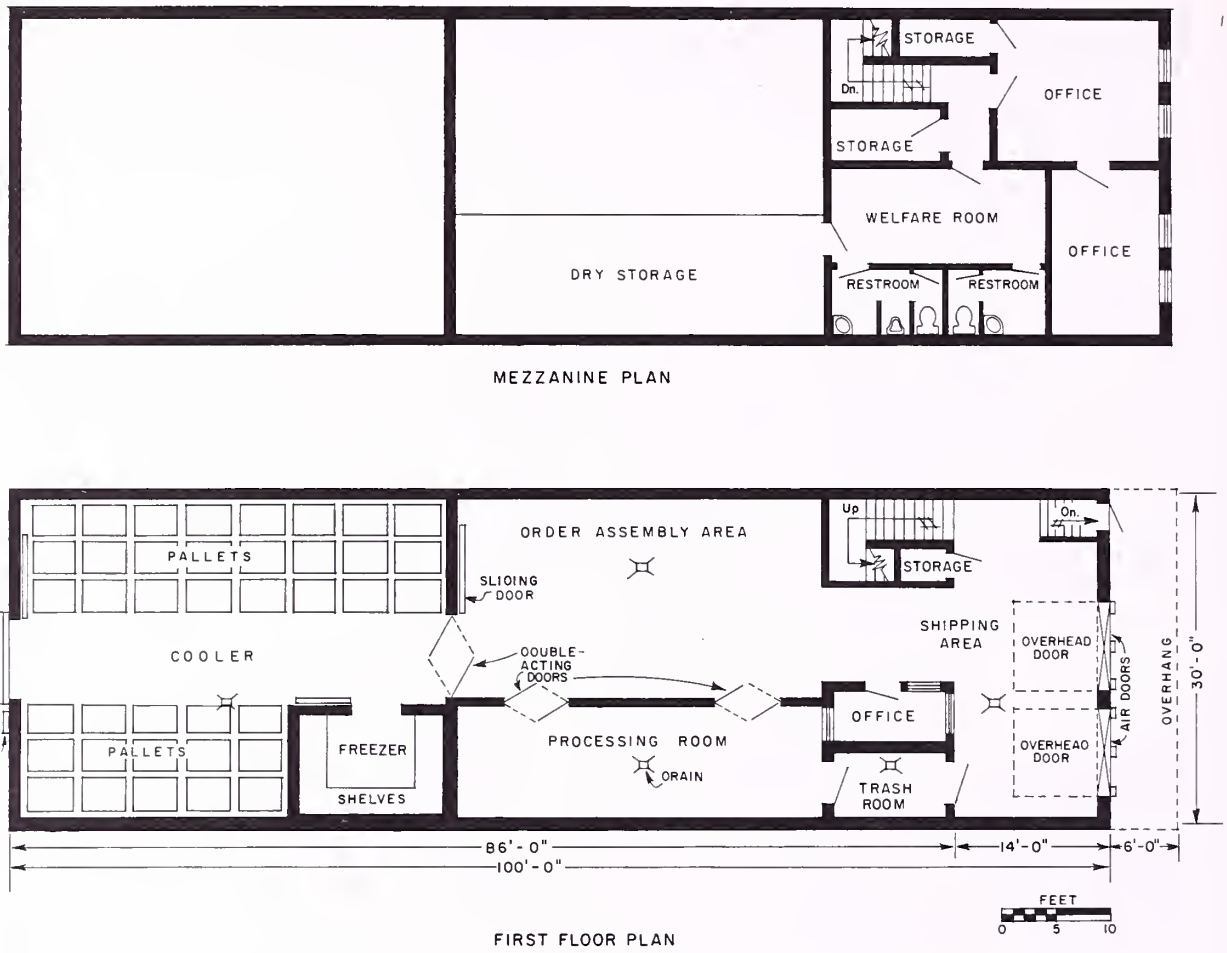

FIGURE 15.—Layout of a poultry firm in a multiple-occupancy building unit.

capable of supplying 700 tons of refrigeration, a network of pipelines to distribute refrigerants to the users, and terminal evaporator units in each user's room to cool the air. A building having about 3,600 square feet of floorspace would be required to house the central plant equipment and facilities.

Rail Access

Firms using rail service extensively should have tracks adjacent to their facilities. Tracks nearest the building would serve as house tracks and those outside as switching tracks. House tracks are positioned so that products can be unloaded directly from railcars into facilities. Buildings should be so arranged that trackage could be provided for those firms that might desire rail service in the future.

Streets and Parking Areas

All streets in the proposed market should be wide enough for present and future use. They should have the capacity to carry heavy traffic and to facilitate drainage away from the buildings.

Parking areas should be an integral part of the market and should have room for expansion. Selected parking sites should be designated for use by over-the-road trucks, whereas others should be reserved for small trucks and cars. About 235 parking spaces would be presently required for all types of cars and trucks.

Restaurant

One restaurant unit is provided in the multiple-occupancy building. Equipment and furnishings should be supplied by the tenant.

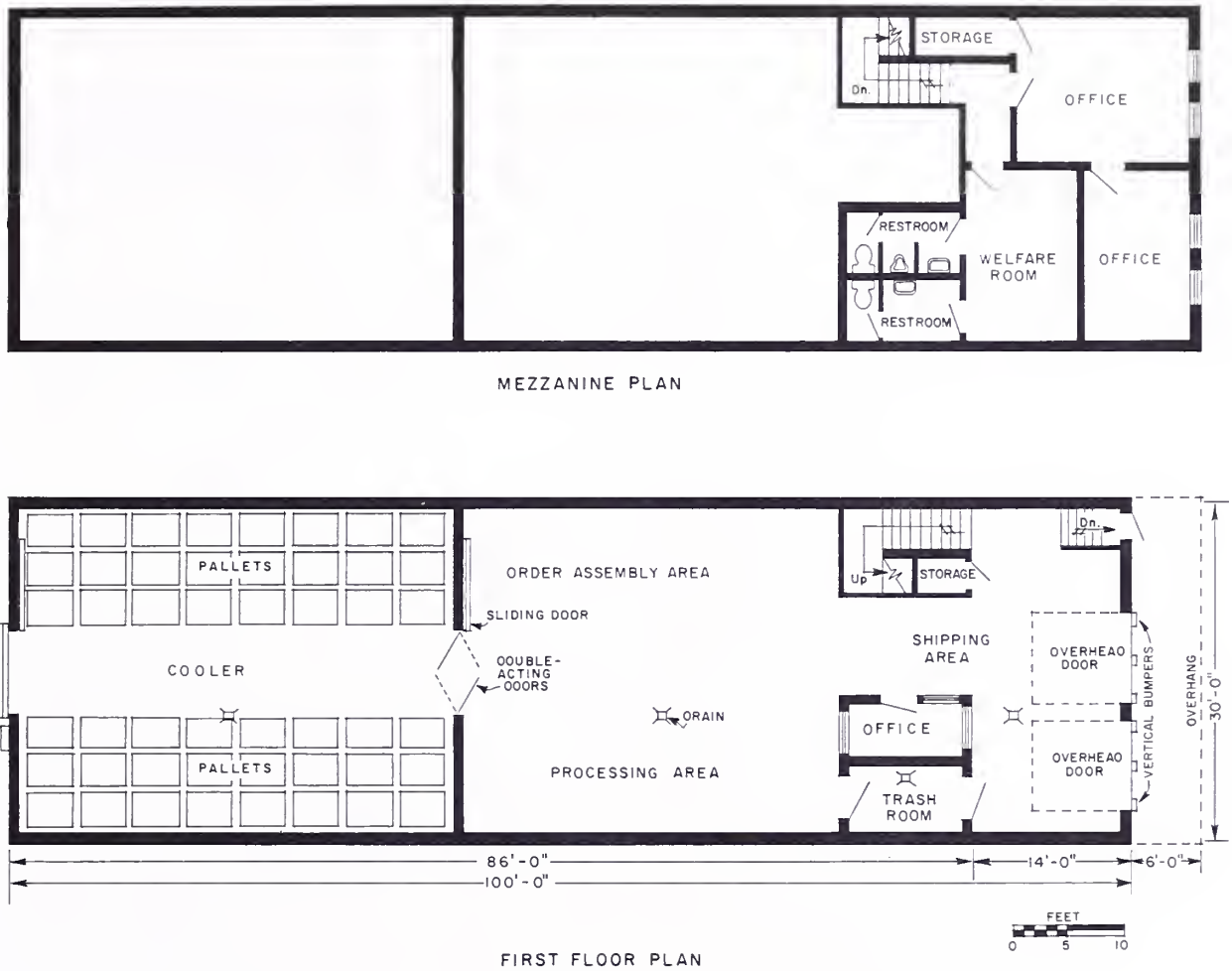

FIGURE 16.—Layout of an egg firm in a multiple-occupancy building unit.

Solid Waste (Trash) Disposal

Handling and disposing of solid waste generated in wholesale food distribution centers can be a significant problem. Antipollution legislation in some areas of the country is limiting the choice of solid waste-management systems and forcing some food centers to upgrade their present methods.

Many types of waste-management systems are available. When selecting one of them, some factors to be considered are (1) economic feasibility of implementing the system while considering the physical characteristics of a particular center, (2) acceptability to the tenants, and (3) present or pending antipollution regulations.

Expansion Areas

When obtaining land for a market site, sufficient land should be acquired at the outset for expansion and growth. Expansion should be provided for in total acreage required. In addition, land adjacent to the site should be available for future use by food firms or allied industry that may wish to locate in the center.

Arrangement of Facilities

The final arrangement of buildings and other facilities in the wholesale food center will depend on the physical characteristics of the site selected, the location of present and proposed traffic arteries, and the accessibility of rail.

Figure 17 shows a master plan of the facilities recommended for the Wichita wholesale food distribution center. Figure 18 is an artist's conception of this plan.

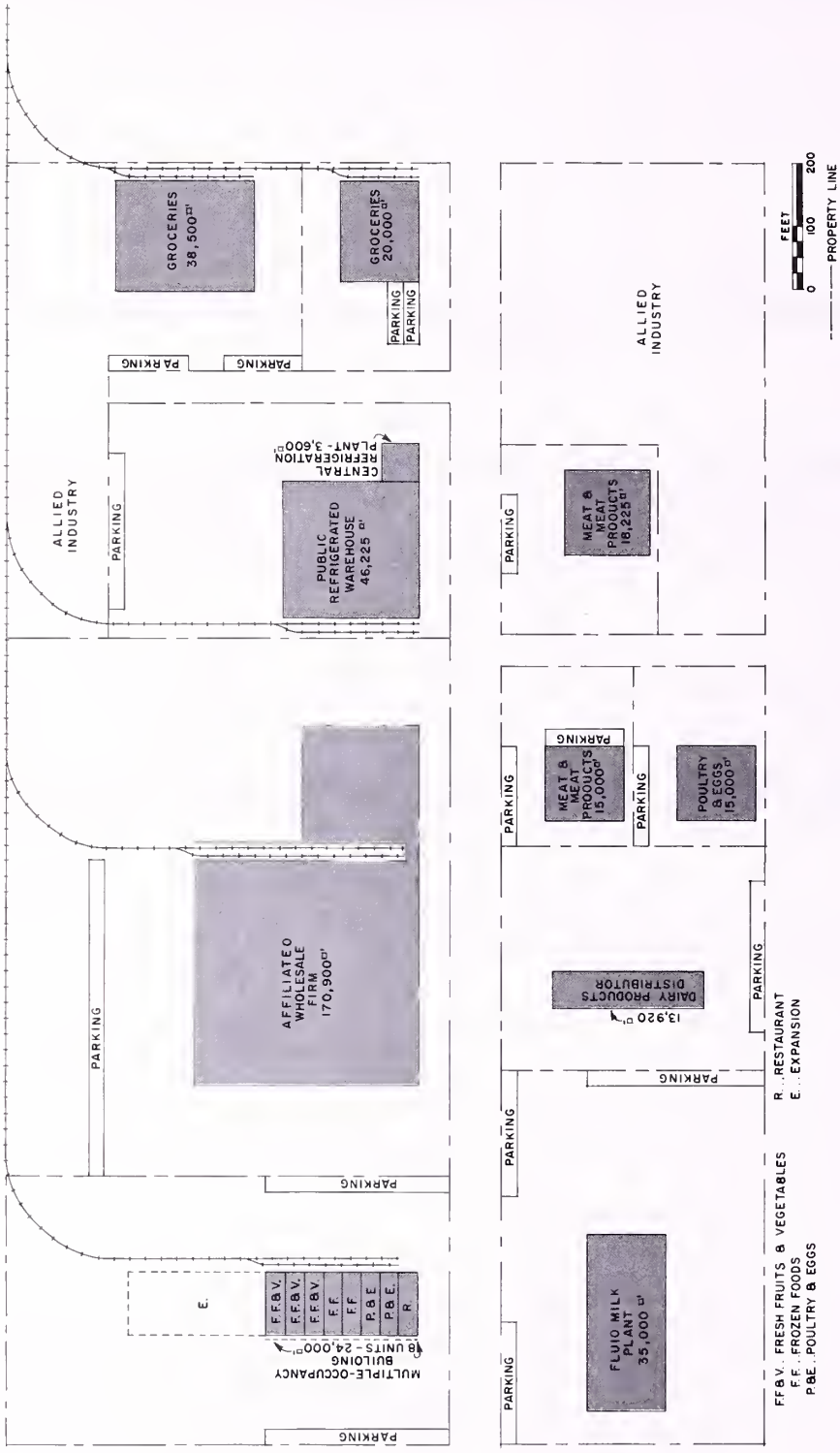

FIGURE 17.—Master plan for the proposed Wichita food distribution center.

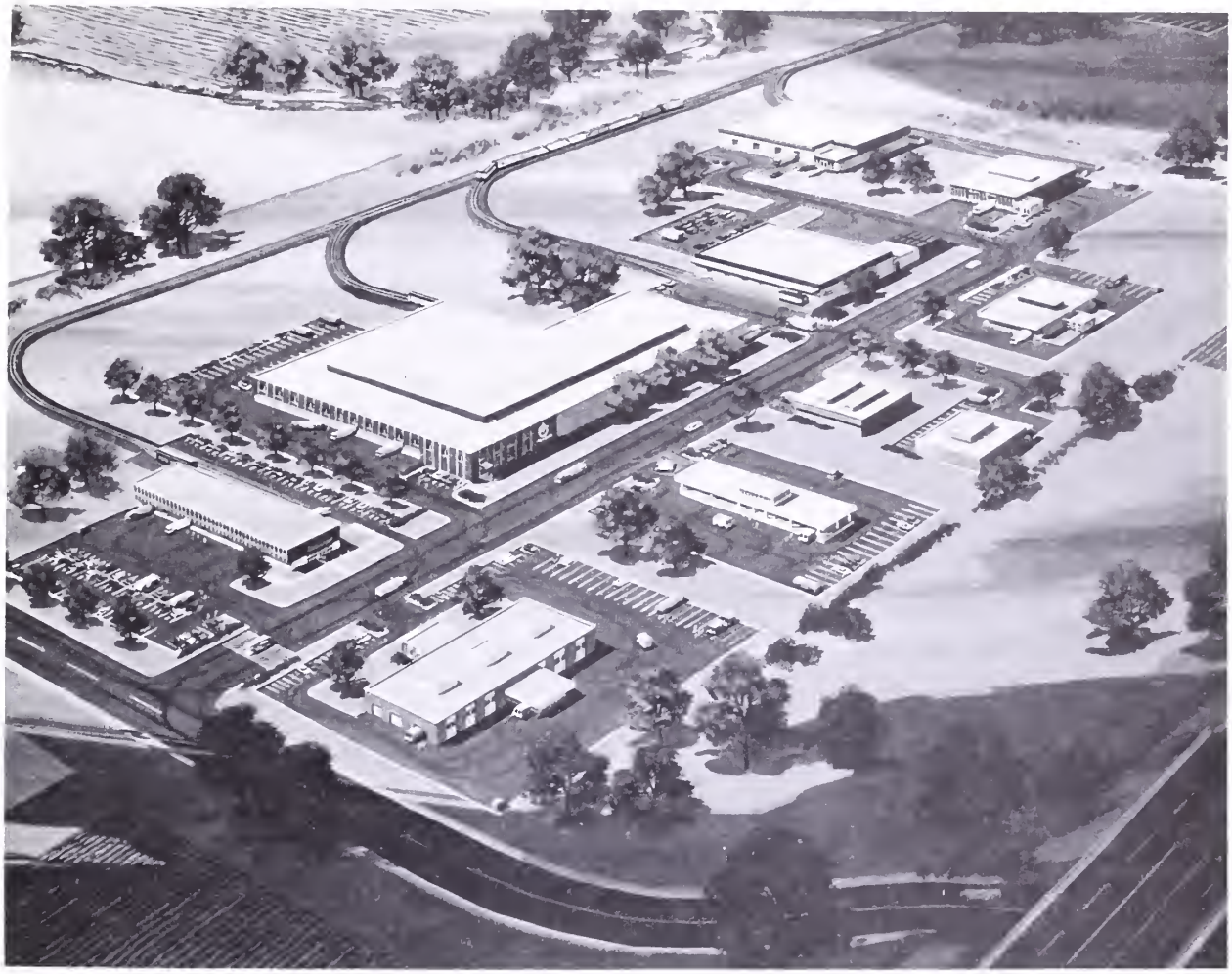

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FIGURE 18.—Artist's conception of the proposed Wichita food distribution center.

Wholesale firms with a common interest are grouped together. Commodity grouping facilitates transactions among the wholesalers of like commodities.

In the master plan the public refrigerated warehouse and the central refrigeration plant are situated where they can best serve the market. Areas for expansion should be available for all present and future tenants of the center. Facilities should be so arranged that traffic is distributed as evenly as possible throughout the entire market.

Acreage Needed

A food distribution center for Wichita would require approximately 56 acres; 49 acres would be needed for the recommended buildings and service facilities and 7 acres for other food firms or allied industries. Failure to acquire sufficient land could limit the potential of the market.

SELECTING A SITE FOR A FOOD DISTRIBUTION CENTER

Factors To Consider

When choosing the best possible site for a food distribution center, certain criteria should be considered:

(1) Proximity to customers.
(2) Accessibility to transportation arteries.
(3) Avoidance of nonmarket traffic.
(4) Availability of land and utilities.
(5) Physical features of the site.
(6) Land use.

Proximity to Customers.—Select a site where a minimum of travel time is required by wholesalers to distribute commodities. A site as close as possible to the center of distribution is one of the essential factors to consider.

Accessibility to Transportation Arteries.—The large volume of products received and distributed at a food center makes convenient access to highways and rail facilities a vital requirement. Trucks handle about 81 percent of the inbound food receipts. Since nearly all food is distributed in the Wichita area by truck, a site should have direct access to the major highway system and good access to arterial streets.

Since rail receipts accounted for about 19 percent of the total, the proposed food distribution center should also have good access to railroad facilities. Consider the various rail-switching limits so that perishables and other products can be handled as quickly as possible.

Avoidance of Nonmarket Traffic.—The movement of food in and out of wholesale facilities is conducive to traffic congestion. Routing traffic, even in a well-planned facility, can be a serious and complicated problem. The presence of nonmarket traffic creates additional traffic and security problems. Market and nonmarket vehicles often compete for available space. Therefore select a site that will minimize the conflict between these two types of traffic.

Availability of Land and Utilities.—The problem of land assembly may be complicated when dealing with several separate owners of small parcels of land. Accessibility to public utilities, such as water, gas, electricity, and sewage-disposal facilities, affects the suitability of a site. Depending on the site selected, a developer may be required to bear a part of or the entire cost of providing utilities.

Physical Features of the Site.—The general topography of a site and its shape are important factors. Investigate thoroughly the possibility of adapting the facilities to a site before making firm commitments to purchase or build. A site requiring an excessive amount of fill or piling can significantly increase the cost of the entire project.

Land Use.—Do not consider a site if it is near a heavy industrial complex producing air pollution. Noxious odors and air contamination would not be conducive to maintaining food quality.

Possible Sites

Possible sites were suggested by officials at various levels of governmental planning, and by wholesalers, trade group representatives, and other interested parties. Many of these sites were eliminated because they did not meet acreage requirements, lacked adequate access to transportation arteries, or failed to meet other essential criteria.

Because it is impossible to cover all potential sites in detail, the following five sites that conformed to the distribution pattern of the wholesale food companies were chosen: Bridgeport, Wichita Township, Kechi Township, Riverside, and Southwest Industrial Park. These representative sites are shown in figure 19 and described in table 5.

Each has specific advantages. All could be served by rail, and highway access is good. Zoning would not appear to be a problem at any of the locations. All sites have been reviewed by the planning staff of Wichita.

Bridgeport

The Bridgeport site is just north of the Union Stockyards. Its boundaries are 37th Street, Santa Fe Avenue, 33d Street, and Atchison, Topeka and Santa Fe Railroad. The site has 72 acres with another 66 acres available nearby. The zoning is heavy industrial, but there is residential housing and light industry. It is

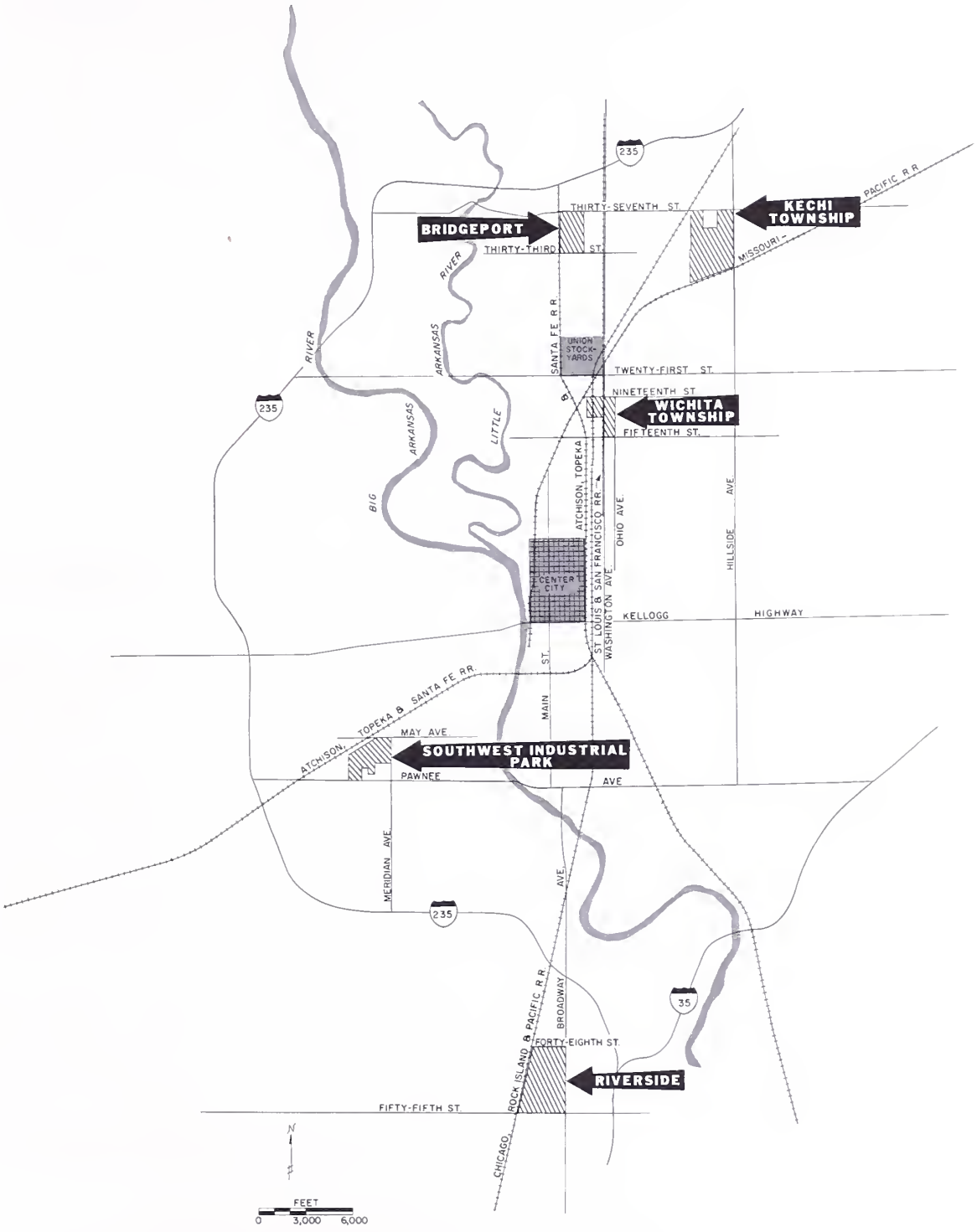

FIGURE 19.—Possible sites for a proposed food distribution center.

TABLE 5.—*Description of 5 possible sites for Wichita wholesale food distribution center*

Site	Approximate size	Present land use	Access to—		Distance to downtown	Topography and soil condition	Utilities available	Zoning	Cost per acre
			Rail transportation	Highways					
	Acres				*Miles*				*Dollars*
Bridgeport	[1] 72	Some residential housing; some light industrial use.	Rail adjacent to site.	Broadway (U.S. 81) to downtown core area; Interstate 235 and 35 via 29th St.	3½	Flat; little grading required after building demolition; subsoil good.	All	Heavy industrial.	8,500
Wichita Township	[2] 70	----do	Rail (2) on site.	Broadway (U.S. 81) to downtown core area; Interstate 35 and 235 and Kansas Turnpike via proposed interchange at 13th St. and Interstate 35.	2½	----do	----do	Light industrial.	15,300
Kechi Township	[2] 270	Agricultural; has several farmsteads.	Rail (2) adjacent to site.	Hillside and Douglas Ave. to downtown core area; Interstate 235 via Hillside Ave.; Interstate 35 via 29th St.	4	Flat; little grading required; subsoil undetermined; some drainage problems (natural drainage ditch runs through property).	All except sewerage, which must be extended from 29th St.	----do	3,000
Riverside	250	Agricultural; has several oil wells.	Rail adjacent to site.	Broadway (U.S. 81) to downtown core area; Kansas Turnpike and Interstate 235 and 35 via 47th St.	4¾	Flat; little grading required; subsoil good.	All	Residential; northern ⅓ light industrial.	4,500
Southwest Industrial Park	122	Predominantly vacant.	Rail spur on site.	Meridian to Kellogg (U.S. 54) to Broadway Ave. (U.S. 81) to downtown core area; Interstate 235 and Kansas Turnpike via Meridian Ave.	4	----do	----do	Light industrial.	42,000

[1] Additional 66 acres available nearby.
[2] Additional 90 acres available on west.

served by the Atchison, Topeka and Santa Fe Railroad and is within 3½ miles of downtown Wichita. It has good access to the downtown area and also to Interstate 235 and 35. Little grading would be necessary, and all utilities are available. Its estimated cost in condition to use is $8,500 per acre.[8]

Wichita Township

This site is south of the Union Stockyards. Its boundaries are 19th Street, Ohio Avenue, 15th and 17th Streets, and Washington and Santa Fe Avenues. Its 70 acres are zoned light industrial, and it has residential housing with some light industrial use. It is served by the St. Louis and San Francisco and the Chicago, Rock Island and Pacific Railroads. It has access to downtown Wichita via major city streets. It also has access to Interstate 35 and 235 and the Kansas Turnpike via the proposed interchange at 13th Street and Interstate 35. The land would require a minimum of grading. All utilities are available. Its estimated cost in condition to use is $15,300 per acre.

Kechi Township

The Kechi site is directly east of the Bridgeport site. Its boundaries are 37th Street excluding TV station property, Hillside Avenue, the Missouri-Pacific Railroad, and Grove Street ex-

[8] The cost of putting land in condition to use includes demolition of buildings, removal of trees and other obstructions, and grading. It does not include curbing streets, on-site utilities, or piling.

tended. Its 270 acres are zoned light industrial and are presently used for agricultural purposes. It is 4 miles from downtown Wichita and has access to it via Hillside and Douglas Avenues. It also has access to Interstate 235 via Hillside Avenue and to Interstate 35 via 29th Street. The land would require little grading, although there are some drainage problems. The site is served by the Chicago, Rock Island and Pacific and the Missouri-Pacific Railroads. All utilities are available except sewerage, which must be extended from 29th Street. In condition to use, the land cost is estimated at $3,000 per acre.

Riverside

Riverside is a 250-acre site about 4¾ miles south of the downtown area. Its boundaries are 48th Street, Broadway Avenue, 55th Street, and the Chicago, Rock Island and Pacific Railroad. The land is zoned residential with the northern one-third zoned light industrial. It is used agriculturally and has several oil wells. Access to the Kansas Turnpike and Interstate 235 and 35 is via 47th Street. Little grading would be required, and all utilities are available. Cost per acre in condition to use is estimated at $4,500.

Southwest Industrial Park

This predominantly vacant 122-acre site is about 4 miles southwest of the downtown area and is served by the Atchison, Topeka and Santa Fe Railroad. Its boundaries are May Avenue and this railroad, Meridian Avenue, Pawnee Avenue and three commercial firms, and Sheridan Avenue. It has access to Interstate 235 and the Kansas Turnpike via Meridian Avenue. All utilities are available. Cost per acre in condition to use is estimated at $42,000.

ESTIMATED INVESTMENT COSTS FOR LAND AND FACILITIES

The initial investment in a wholesale food distribution center would include two major cost components—land and facilities. For the sites described, the cost of land in condition to use was estimated from $3,000 to $42,000 per acre. Actual cost per acre of an individual site cannot be definitely established until negotiations for purchase are made. For purposes of this report, the cost of 6.82 acres for allied industries was excluded from the computations. The estimated cost of 48.97 acres in condition to use at the various sites is as follows:

	1,000 dollars
Bridgeport	416.3
Wichita Township	749.2
Kechi Township	146.9
Riverside	220.4
Southwest Industrial Park	2,056.7

A total investment of $12,997,800 is required to meet the facility needs of the candidate firms. (Detailed construction costs for the center are presented in appendix II.) *This estimated construction cost is not intended to replace firm estimates by local architects and contractors and should be considered only for illustrative purposes.*

These estimates are based on reviews of 1970–72 real estate transactions in Wichita and estimates made by city officials familiar with land transactions.

The estimated investment costs for both land and facilities at each of the five proposed sites are summarized in table 6. Facility costs in this table include construction costs, architect's fee, construction loan, and contingency allowance. These estimated costs range from $13.1 to $15.1 million depending on the site selected and are based on the arrangement in the master plan (fig. 17).

METHODS OF FINANCING

Whether public or private funds are used, prospective investors will expect a reasonable return on their investment with a minimum of risk. To protect investors, it would be desirable to have a board of directors or some other form of management to represent all groups con-

TABLE 6.—*Estimated investment costs for land and facilities at 5 proposed sites for a wholesale food distribution center* [1]

Item	Bridgeport ($8,500 per acre)	Wichita Township ($15,300 per acre)	Kechi Township ($3,000 per acre)	Riverside ($4,500 per acre)	Southwest Industrial Park ($42,000 per acre)
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Wholesale food facilities:					
Land (43.35 acres)	368.6	663.2	130.1	195.1	1,820.6
Facilities [2]	9,388.8	9,388.8	9,388.8	9,388.8	9,388.8
Total	9,757.4	10,052.0	9,518.9	9,583.9	11,209.4
Public refrigerated warehouse:					
Land (5.18 acres)	44.0	79.3	15.5	23.3	217.6
Facilities	2,531.8	2,531.8	2,531.8	2,531.8	2,531.8
Total	2,575.8	2,611.1	2,547.3	2,555.1	2,749.4
Central refrigeration plant:					
Land (0.44 acre)	3.7	6.7	1.3	2.0	18.5
Facilities	1,077.2	1,077.2	1,077.2	1,077.2	1,077.2
Total	1,080.9	1,083.9	1,078.5	1,079.2	1,095.7
Total investment:					
Land (48.97 acres)	416.3	749.2	146.9	220.4	2,056.7
Facilities	12,997.8	12,997.8	12,997.8	12,997.8	12,997.8
Total	13,414.1	13,747.0	13,144.7	13,218.2	15,054.5

[1] Land costs based on estimates by city officials familiar with land transactions.
[2] Includes cost of 1 unit in multiple-occupancy building to be used as a restaurant.

cerned with the center's operation. There should be definite assurance that—

(1) The center will be properly located, designed, and equipped.

(2) Overbuilding will be minimized so as to assure maximum occupancy.

(3) Funds will be invested wisely to insure that the facility costs are no higher than necessary.

(4) Facilities of the center will be used in the best interests of the industry and the public.

(5) The center will be operated without discrimination against any buyer, seller, mode of transportation, or origin of shipment.

There are several ways to finance and operate food distribution centers. Some of the more common methods are private corporations, public benefit corporations, direct public ownership, and various combinations of these methods. The final choice of the financing method would depend on many factors existing at the time of construction.

Private Corporation

A private corporation usually is organized for profit, but it may also operate on a nonprofit basis. When it is operated for profit, sales of stock are open to any individual wishing to buy. Stockholders normally have one vote in corporate affairs for each share of voting stock held. A major advantage of a private corporation is the ability of the board of directors to make decisions quickly and without the delay found in other types of organizations. In addition, when the period of amortization expires, the

entire investment belongs to the stockholders, tenancy changes have no effect on stock ownership, and transfer of stock is unrestricted. The major problem of corporate ownership is that a substantial financial equity is required.

Many wholesale food markets are owned and operated by private corporations. In some of these corporations the principal stockholders are the tenants or wholesalers. In others the corporation may be a railroad company or some other company organized primarily for another type of business.

Public Benefit Corporation

A public benefit corporation is a nonprofit agency controlled by the State or local government for the benefit of the local citizens. As such, rentals and other charges do not exceed the amount needed to pay the costs of operation, amortize the original investment, and maintain a limited reserve for contingencies. Since under public ownership the revenues would be considered public funds, the reserve fund could not be paid to lessees as dividends.

Public benefit corporations are frequently formed as market authorities. They have many useful features not found in other types of ownership. They usually have the power of eminent domain, which can be useful in acquiring a site. Market authorities can usually finance market improvements through the sale of revenue bonds. This type of financing normally is not a full obligation of a State or political subdivision. Since these bonds are often tax exempt, the interest cost is lower. A public agency, such as a market authority, is more likely than a private corporation to provide for future expansion and to work toward a complete wholesale distribution center. It may not be required to pay taxes to the community in which it is located.

Market authorities also have certain limitations, especially in the financing and managing of the facilities. They may find it difficult to raise funds through revenue bonds unless considerable equity funds are provided in some way or the bonds are guaranteed by the city, county, or State. Some State or city governments have appropriated part of the funds needed for land acquisition and original construction. The continuity of management may depend on the continuance of a State or municipal government administration in office. As a whole, market authorities do not have as complete freedom of operation as is possible under private ownership.

Direct Public Ownership

Some wholesale food market facilities have been financed, constructed, and operated by States, counties, and municipalities. Several States and municipalities have enabling legislation covering the improvement or establishment of markets.

Direct State ownership and operation usually can be differentiated from ownership and operation by a State market authority by the methods of financing used and the delegation of authority made by the State legislature. Although several States have appropriated funds and otherwise assisted market authorities with financial problems, they do not usually underwrite the total cost of a market constructed by an authority, nor have the States always assumed responsibility for the operation of these markets. Direct State ownership depends on the market facility being financed in whole or in part by an appropriation of State funds. If the financing is not entirely by this method, the State usually is obligated for the remainder unless this balance is obtained through grants or donations. Also, the State is responsible for maintenance and other expenses involved in the operation of a State-owned market.

Municipal ownership of a wholesale food market is comparable in many of its basic aspects to direct State ownership. Some municipalities are authorized in their charters to construct and operate food markets. Some city councils or commissions are not authorized to appropriate from general funds in the city treasury for the construction of market facilities on a basis comparable to that of a State legislature. Methods usually open to municipalities for financing a market program are (1) issuing municipal bonds, (2) issuing revenue warrants, and (3) obtaining loans from public corporations. In most cities, issuing bonds for such purposes must be approved in a referendum by a majority of the qualified voters. States may finance, construct, and operate wholesale food market facilities because the State legislatures consider

that improved facilities in themselves will serve the public interest. Facilities constructed with municipal or county funds would necessarily be owned by the municipality or county, and rent would have to be paid by the tenants indefinitely.

Combination of Financing Methods

Because of the complexity of building large wholesale food distribution centers, some are built by a combination of public and private funds. Several food distribution centers that have been built in the United States typify the possibility of various combinations.

A food distribution center was built in Philadelphia by a nonprofit corporation on land owned and put into condition to build by the city. The city subordinated its interest in the land so that the land could be used as equity in borrowing money for building construction. Where the multiple-occupancy buildings were constructed, the development company leased the units to operating stock companies formed by the prospective tenants. At the end of 30 years, all buildings will become the property of the city except those built on the parcels sold by the developing company with city approval for construction of single-occupancy buildings.

A food distribution center at Hunts Point, N.Y., is owned by the city and makes direct leases to the tenants in the fruit and vegetable section of the market and to operators in single-occupancy buildings. Other sections of the market are to be built by the city but leased to corporations consisting of groups of merchants. The city manages and maintains the center, which was financed through general obligation bonds.

The New England Produce Center, Inc., and the Boston Food Center were constructed in the Boston metropolitan area by private food corporations. These centers are entirely owned and operated by the participating food firms. To develop these markets, equity funds were provided by the stockholders on the basis of their participation. The major sources of financing were from local lending institutions and the U.S. Small Business Administration.

ESTIMATED ANNUAL OPERATING COSTS AND REVENUE REQUIREMENTS

The proposed food center in Wichita could be financed with industrial revenue bonds. The issue of these bonds would be controlled by the enabling legislation as provided in the Kansas Statutes Annotated, Sections 12-1740 to 12-1749. These bonds could be individually issued by groups of tenants of the proposed food center in order to stay within the federally tax exempt $5-million limit per issue. These issues would need to have the consent of the city commission. Some advantages of these bonds are as follows:

(1) There are no federal taxes on municipal revenue bonds.

(2) Interest rates would be lower than in the private lending market.

(3) Real estate taxes would be defrayed for the first 10 years the food center was in operation.

(4) No principal payments on these bonds are required for the first 5 years.

To control the site and its development, some form of holding company could be formed by the tenants.

The method selected to finance and operate the proposed food distribution center will affect the annual revenue required. It has been assumed that industrial revenue bonds will be used to finance construction of the proposed facilities on 48.97 acres of land. This assumption is not intended to imply that this is the only desirable method of financing. For comparison purposes, conventional private financing is also shown.

The annual operating expenses and revenue requirements for the proposed center include (1) debt service, (2) real estate taxes, and (3) management, insurance, and repairs including upkeep.

Debt Service

The wholesale food distribution center should be financed so that it will be self-sustaining. A

major cost item that must be paid is debt service. If the market is to be self-liquidating, the investment must be repaid from market revenue.

The facilities designed for the recommended food center should not become obsolete in less than 25 years and very likely would be useful for a much longer period. The proposed facilities are of durable construction and with few minor alterations could be expanded or converted for use by several types of occupants.

If bonds are issued, purchasers might demand that the annual income exceed annual expenses and that a fund to guarantee payment be created. Collections for the contingency allowance are proposed at 10 percent per year. After the reserve covers 1 year of amortization payment, this allowance might be discontinued.

To determine the annual revenue required for the proposed food center, a rate of 7½ percent for industrial revenue bonds (IRB's) and 9 percent for conventional financing for a 25-year period has been assumed. Based on these assumptions, the annual revenue required for debt service (table 7) would range from $1,282.2 to $1,468.4 thousand with IRB's and $1,457.5 to $1,669.3 thousand with conventional financing.

Real Estate Taxes

One of the major expenses in operating the proposed wholesale food center would be taxes on real property and improvements. By using industrial revenue bonds, however, real estate taxes are defrayed for the first 10 years. For purposes of this report, the taxes for the last 15 years of the amortization period for IRB's are leveled over the entire 25-year period to give a more representative idea of the average annual cost.

Properties were assessed at 30 percent of the market value in Wichita. In this report, market value is the total investment in land and facilities. The 1972 tax rate per $1,000 of assessed valuation was $106.

Taxes probably will increase through revised valuations, higher rates, or a combination of both. A contingency allowance of 10 percent is included to allow for these increases. After a sizable reserve has been accumulated, this practice might be discontinued. The estimated taxes to be paid annually on real property and improvements at the five sites is shown in table 7. Annual taxes and contingencies range from $275.9 to $316 thousand with IRB's and $459.8 to $526.6 thousand with conventional private financing.

Management, Insurance, and Repairs

Management costs are based on annual reports of other wholesale food distribution centers and estimates of such costs in the Wichita area. These costs include a salary for the part-time manager, auditing and legal services, advertising and promotion, office rental, office supplies and equipment, and telephone and other communications. These costs are generally flexible and depend on the need of the tenants within the center. It is assumed that sanitation expenses and public protection would be provided by city, county, or both governments.

The insurance rates used in this report are based on estimates made by local underwriters of fire and liability insurance. Fire insurance rates are based on tilt-up concrete construction, metal roof decks, concrete floors, and automatic sprinklers properly installed according to standards and supplied with adequate water pressure and volume of water. Liability insurance is also based on an estimate by local underwriters.

Fire, extended coverage, vandalism, and sprinkler leakage insurance rates are estimated to be $0.0353 per $100 of value with value based on 90 percent of the cost of the buildings and sprinklers. This amounts to approximately $28,700 annually. In addition, leasers' liability insurance would total about $800 annually for the entire project. These insurance rates are not applied to, nor do they include, any property of tenants.

Repairs, including upkeep, are assumed to be 0.5 percent of the facility cost (building, other facilities, and associated construction cost) and total $65,000 annually. This percentage is used because the type of construction anticipated for the proposed center requires a relatively low

TABLE 7.—*Comparison of estimated total annual debt service payments, real estate taxes, and revenue required for 14 candidate firms at 5 proposed sites for a wholesale food distribution center using industrial revenue bonds (IRB's) and conventional private financing*

Item	Bridgeport		Wichita Township		Kechi Township		Riverside		Southwest Industrial Park	
	IRB's	Private	IRB's	Private	IRB's	Private	IRB's	Private	IRB's	Private
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
					DEBT SERVICE[1]					
Wholesale food facilities:										
Amortization	865.3	983.6	891.5	1,013.2	844.1	959.5	849.9	966.1	994.0	1,129.9
Contingency allowance	86.6	98.3	89.1	101.3	84.4	95.9	85.0	96.6	99.3	113.0
Total	951.9	1,081.9	980.6	1,114.5	928.5	1,055.4	934.9	1,062.7	1,093.3	1,242.9
Public refrigerated warehouse:										
Amortization	228.4	259.6	231.3	263.2	225.9	256.8	226.6	257.5	243.8	277.1
Contingency allowance	22.8	26.0	23.1	26.3	22.6	25.7	22.7	25.7	24.4	27.7
Total	251.2	285.6	254.4	289.5	248.5	282.5	249.3	283.2	268.2	304.8
Central refrigeration plant:										
Amortization	95.6	109.0	96.1	109.3	95.6	108.7	95.7	108.8	97.2	110.5
Contingency allowance	9.6	10.9	9.6	10.9	9.6	10.9	9.6	10.9	9.7	11.1
Total	105.2	119.9	105.7	120.2	105.2	119.6	105.3	119.7	106.9	121.6
Grand total:										
Amortization	1,189.3	1,352.2	1,218.9	1,385.7	1,165.6	1,325.0	1,172.2	1,332.4	1,335.0	1,517.5
Contingency allowance	119.0	135.2	121.8	138.5	116.6	132.5	117.3	133.2	133.4	151.8
Total debt service	1,308.3	1,487.4	1,340.7	1,524.2	1,282.2	1,457.5	1,289.5	1,465.6	1,468.4	1,669.3
					REAL ESTATE TAXES[2]					
Wholesale food facilities:										
Tax	186.2	310.3	191.8	319.7	181.6	302.7	182.9	304.8	213.9	356.5
Contingency allowance	18.6	31.0	19.2	32.0	18.2	30.3	18.2	30.5	21.3	35.7
Total	204.8	341.3	211.0	351.7	199.8	333.0	201.1	335.3	235.2	392.2
Public refrigerated warehouse:										
Tax	49.1	81.9	49.8	83.0	48.6	81.0	48.8	81.2	52.5	87.4
Contingency allowance	4.9	8.2	4.9	8.3	4.8	8.1	4.9	8.1	5.3	8.7
Total	54.0	90.1	54.7	91.3	53.4	89.1	53.7	89.3	57.8	96.1
Central refrigeration plant:										
Tax	20.6	34.4	20.7	34.5	20.6	34.3	20.6	34.3	20.9	34.8
Contingency allowance	2.1	3.4	2.1	3.5	2.1	3.4	2.1	3.4	2.1	3.5
Total	22.7	37.8	22.8	38.0	22.7	37.7	22.7	37.7	23.0	38.3
Grand total:										
Tax	255.9	426.6	262.3	437.2	250.8	418.0	252.3	420.3	287.3	478.7
Contingency allowance	25.6	42.6	26.2	43.8	25.1	41.8	25.2	42.0	28.7	47.9
Total	281.5	469.2	288.5	481.0	275.9	459.8	277.5	462.3	316.0	526.6

	REVENUE REQUIRED [3]									
Wholesale food facilities:										
Debt service	951.9	1,081.9	980.6	1,114.5	928.5	1,055.4	934.9	1,062.7	1,093.3	1,242.9
Real estate taxes	204.8	341.3	211.0	351.7	199.8	333.0	201.1	335.3	235.2	392.2
Management, insurance, and repairs	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3
Total	1,242.0	1,508.5	1,276.9	1,551.5	1,213.6	1,473.7	1,221.3	1,483.3	1,413.8	1,720.4
Public refrigerated warehouse:										
Debt service	251.2	285.6	254.4	289.5	248.5	282.5	249.3	283.2	268.2	304.8
Real estate taxes	54.0	90.1	54.7	91.3	53.4	89.1	53.7	89.3	57.8	96.1
Management, insurance, and repairs	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8
Total	327.0	397.5	330.9	402.6	323.7	393.4	324.8	394.3	347.8	422.7
Central refrigeration plant:										
Debt service	105.2	119.9	105.7	120.2	105.2	119.6	105.3	119.7	106.9	121.6
Real estate taxes	22.7	37.8	22.8	38.0	22.7	37.7	22.7	37.7	23.0	38.3
Management, insurance, and repairs	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2
Total	137.1	166.9	137.7	167.4	137.1	166.5	137.2	166.6	139.1	169.1
Grand total:										
Debt service	1,308.3	1,487.4	1,340.7	1,524.2	1,282.2	1,457.5	1,289.5	1,465.6	1,468.4	1,669.3
Real estate taxes	281.5	469.2	288.5	481.0	275.9	459.8	277.5	462.3	316.0	526.6
Management, insurance, and repairs	116.3	116.3	116.3	116.3	116.3	116.3	116.3	116.3	116.3	116.3
Total	1,706.1	2,072.9	1,745.5	2,121.5	1,674.4	2,033.6	1,683.3	2,044.2	1,900.7	2,312.2

[1] Amortization based on 7½ percent for industrial revenue bonds over 25 years on total investment cost (table 6) at $88.68 per $1,000 and based on 9 percent for conventional private financing over 25 years on total investment cost at $100.80 per $1,000. Contingency allowance based on 10 percent of indicated amortization rate.

[2] For industrial revenue bonds, taxes based on $106 per thousand of assessed valuation for last 15 years of amortization period and averaged over entire 25-year amortization period; for private financing, tax rate applies over entire 25-year period. Tax is assessed valuation based on 30 percent of total investment in land and facilities (table 6). Contingency allowance is 10 percent of indicated tax payment.

[3] Wholesale food facilities include 1 unit used as restaurant. See text for method of calculation. Management allocated by land requirements.

level of maintenance. This rate was not applied to the cost of the land.

A contingency of 10 percent was applied to the total cost of management, insurance, and repairs to cover possible increases. After a sizable reserve has been accumulated, this practice may be discontinued. The total cost of management, insurance, and repairs should be the same at all the sites discussed in this report. This total cost was prorated according to the acreage requirements of the different types of facilities.

The annual cost is estimated as follows:

Management:	
Salary; part-time manager	$6,000
Associated expenses:	
Auditing and legal services	2,500
Advertising and promotion	600
Office rental	1,200
Office supplies and equipment	500
Telephone and other communications	400
Insurance:	
Fire, extended coverage, vandalism, and sprinkler leakage	28,700
Leasers' liability	800
Repairs	65,000
Total	105,700
Contingency[1]	10,600
Grand total	116,300

[1] Based on 10 percent of above cost rounded to the nearest $100.

Table 7 shows a comparison of the estimated annual revenue required with industrial revenue bonds and conventional private financing to pay debt service, real estate taxes, and management, insurance, and repair costs for the proposed food distribution center. Depending on the site, the revenue required ranges from $1,674.4 to $1,900.7 thousand with IRB's and from $2,033.6 to $2,312.2 thousand using conventional private financing.

ESTIMATED ANNUAL OWNERSHIP OR RENTAL COST

The annual revenue required for the proposed wholesale food distribution center is assumed to be the ownership cost charged for all facilities. The estimated annual ownership cost per square foot of first-floor area using both industrial revenue bonds and conventional private financing at the various sites is shown in table 8. These costs range from $4.18 to $4.74 per square foot assuming IRB's. Equivalent costs assuming private financing range from $5.08 to $5.77. Mezzanine costs are allocated to the first floor, and no provision is made for vacancies in estimating ownership costs.

TABLE 8.—*Comparison of estimated annual ownership cost per square foot of first-floor building area for 14 candidate firms at 5 proposed sites for a wholesale food distribution center using industrial revenue bonds (IRB's) and conventional private financing* [1]

Item	First-floor area required	Bridgeport		Wichita Township		Kechi Township		Riverside		Southwest Industrial Park	
		IRB's	Private	IRB's	Private	IRB's	Private	IRB's	Private	IRB's	Private
	1,000 sq ft	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Wholesale food facilities	350.6	3.54	4.30	3.65	4.42	3.46	4.20	3.48	4.23	4.03	4.91
Public refrigerated warehouse	46.2	7.08	8.60	7.16	8.71	7.01	8.52	7.03	8.53	7.53	9.15
Central refrigeration plant [2]	3.6	38.08	46.36	38.25	46.50	38.08	46.25	38.11	46.28	38.64	46.97
Total or weighted average	400.4	4.26	5.18	4.36	5.30	4.18	5.08	4.20	5.10	4.74	5.77

[1] Based on total annual revenue required in table 7.

[2] Includes cost of central refrigeration plant equipment, refrigerant, distribution lines, and terminal equipment.

COSTS IN NEW FACILITIES

Costs of operation in new facilities were estimated for 12 of the 14 candidate firms and are summarized in table 9. Costs for two candidate fluid milk plants were not included in this analysis. The total selected annual costs of the 12 firms varied according to the method of financing new facilities and the choice of site. Assuming the use of industrial revenue bonds to finance the center, the total selected annual costs would range from $3.1 to $3.3 million or $20.47 to $21.46 per ton. The equivalent costs assuming private financing would range from $3.3 to $3.5 million or $21.94 to $23.17 per ton.

The total and per ton cost data are summarized in table 10.

As the new center will meet the wholesalers' facility needs, no cartage charges are anticipated for receipts by way of public warehouses. Adequate streets, parking areas, and maneuvering space eliminate avoidable delay at the wholesale facilities. Estimated costs of moving products through and from facilities in the proposed wholesale food distribution center are based on research by the U.S. Department of Agriculture and the experience of wholesalers using efficient layouts and proper handling equipment at existing centers.

TABLE 9.—*Selected costs of moving food products to, through, and from proposed wholesale facilities of 12 candidate firms*

Movement of commodities[2]	Bridgeport				Wichita Township			
	IRB's		Private		IRB's		Private	
	Annual cost	Cost per ton	Annual cost	Cost per ton	Annual cost	Cost per ton	Annual cost	Cost per ton
	1,000 dollars	*Dollars*	*1,000 dollars*	*Dollars*	*1,000 dollars*	*Dollars*	*1,000 dollars*	*Dollars*
Through facilities: [3]								
Labor:								
Unloading	297.5	1.96	297.5	1.96	297.5	1.96	297.5	1.96
Handling within	622.0	4.09	622.0	4.09	622.0	4.09	622.0	4.09
Loading out	132.1	.87	132.1	.87	132.1	.87	132.1	.87
Subtotal or weighted average	1,051.6	6.92	1,051.6	6.92	1,051.6	6.92	1,051.6	6.92
Other costs:								
Rent	1,061.4	6.99	1,289.2	8.49	1,088.2	7.16	1,321.8	8.70
Public storage	58.1	.38	58.1	.38	58.1	.38	58.1	.38
Equipment	105.6	.70	105.6	.70	105.6	.70	105.6	.70
Waste, shrinkage, deterioration	110.5	.73	110.5	.73	110.5	.73	110.5	.73
Pilferage	2.5	.02	2.5	.02	2.5	.02	2.5	.02
Refrigeration	117.3	.77	117.3	.77	117.3	.77	117.3	.77
Subtotal or weighted average	1,455.4	9.58	1,683.2	11.08	1,482.2	9.76	1,715.8	11.30
Total or weighted average	2,507.0	16.50	2,734.8	18.00	2,533.8	16.68	2,767.4	18.22
From facilities:								
On wholesalers' trucks to metropolitan area: [4]								
Central	107.5	11.68	107.5	11.68	96.5	10.49	96.5	10.49
Northeast	72.0	6.99	72.0	6.99	92.0	8.93	92.0	8.93
Southeast	153.2	7.74	153.2	7.74	152.4	7.70	152.4	7.70
Southwest	164.3	7.30	164.3	7.30	140.8	6.26	140.8	6.26
Northwest	127.2	7.71	127.2	7.71	122.7	7.44	122.7	7.44
Subtotal or weighted average	624.2	7.97	624.2	7.97	604.4	7.72	604.4	7.72
Total or weighted average [5]	624.2	4.11	624.2	4.11	604.4	3.98	604.4	3.98
Grand total or weighted average	3,131.2	20.61	3,359.0	22.11	3,138.2	20.66	3,371.8	22.20

[1] All costs incurred by the 2 candidate fluid milk processing plants not included in this analysis. Total rent (revenue required, table 7) adjusted to reflect the absence of charges for fluid milk facilities. See appendix I. For product volumes in "Movement of commodities," see table 3. Cost per ton based on annual cost divided by volume.

[2] "To facilities" data: Negligible receipts and costs for cartage from railroad team tracks and airports. No costs resulting from cartage from warehouses, and avoidable delays would be anticipated after a move to new facilities. Costs of direct receipts without cartage are considered as part of shipping cost. Costs of indirect receipts without cartage are considered as a distribution cost and included, if applicable, under "From facilities."

at 5 proposed sites using industrial revenue bonds (IRB's) and conventional private financing [1]

Kechi Township				Riverside				Southwest Industrial Park			
IRB's		Private		IRB's		Private		IRB's		Private	
Annual cost	Cost per ton	Annual cost	Cost per ton	Annual cost	Cost per ton	Annual cost	Cost per ton	Annual cost	Cost per ton	Annual cost	Cost per ton
1,000 dollars	*Dollars*	*1,000 dollars*	*Dollars*	*1,000 dollars*	*Dollars*	*1,000 dollars*	*Dollars*	*1,000 dollars*	*Dollars*	*1,000 dollars*	*Dollars*
297.5	1.96	297.5	1.96	297.5	1.96	297.5	1.96	297.5	1.96	297.5	1.96
622.0	4.09	622.0	4.09	622.0	4.09	622.0	4.09	622.0	4.09	622.0	4.09
132.1	.87	132.1	.87	132.1	.87	132.1	.87	132.1	.87	132.1	.87
1,051.6	6.92	1,051.6	6.92	1,051.6	6.92	1,051.6	6.92	1,051.6	6.92	1,051.6	6.92
1,039.5	6.84	1,262.5	8.31	1,045.5	6.88	1,269.9	8.36	1,193.4	7.86	1,451.9	9.56
58.1	.38	58.1	.38	58.1	.38	58.1	.38	58.1	.38	58.1	.38
105.6	.70	105.6	.70	105.6	.70	105.6	.70	105.6	.70	105.6	.70
110.5	.73	110.5	.73	110.5	.73	110.5	.73	110.5	.73	110.5	.73
2.5	.02	2.5	.02	2.5	.02	2.5	.02	2.5	.02	2.5	.02
117.3	.77	117.3	.77	117.3	.77	117.3	.77	117.3	.77	117.3	.77
1,433.5	9.44	1,656.5	10.91	1,439.5	9.48	1,663.9	10.95	1,587.4	10.45	1,845.9	12.15
2,485.1	16.36	2,708.1	17.83	2,491.1	16.40	2,715.5	17.88	2,639.0	17.37	2,897.5	19.08
107.5	11.68	107.5	11.68	109.2	11.87	109.2	11.87	109.2	11.87	109.2	11.87
72.0	6.99	72.0	6.99	116.3	11.29	116.3	11.29	116.3	11.29	116.3	11.29
153.2	7.74	153.2	7.74	151.8	7.67	151.8	7.67	151.8	7.67	151.8	7.67
164.3	7.30	164.3	7.30	121.2	5.39	121.2	5.39	121.2	5.39	121.2	5.39
127.2	7.71	127.2	7.71	123.3	7.47	123.3	7.47	123.3	7.47	123.3	7.47
624.2	7.97	624.2	7.97	621.8	7.94	621.8	7.94	621.8	7.94	621.8	7.94
624.2	4.11	624.2	4.11	621.8	4.09	621.8	4.09	621.8	4.09	621.8	4.09
3,109.3	20.47	3,332.3	21.94	3,112.9	20.49	3,337.3	21.97	3,260.8	21.46	3,519.3	23.17

[3] Cost per ton based on total volume.

[4] Includes distribution of other wholesalers.

[5] Costs not estimated for commodity movement from facilities "outside metropolitan area" or "picked up by customer."

CONCLUSIONS

The total and per ton cost data in table 10 indicate there apparently would be no immediate economic benefit to the candidate firms from development of the food distribution center outlined in this report. However, this conclusion is not to suggest that individual action by any one of the candidate firms would not be economically feasible and, in fact, necessary to insure their survival and growth, especially those firms that are occupying relatively inefficient facilities or are faced with such immediate problems as urban renewal or a need to expand operations. By independently developing improved facilities, these firms could solve their immediate problems, be better prepared for the future, and be in a position to provide food wholesaling services to the community at minimum cost.

TABLE 10.—*Summary of selected costs of handling food products to, through, and from proposed and present wholesale facilities of 12 candidate firms using industrial revenue bonds (IRB's) and conventional private financing*[1]

Facility and type of financing	Total cost	Cost per ton
	1,000 dollars	*Dollars*
Proposed (IRB's)	3,150.4	20.74
Present	2,485.7	16.36
Difference	664.7	4.38
Proposed (private)	3,383.9	22.28
Present	2,485.7	16.36
Difference	898.2	5.92

[1] Data for proposed and present facilities based on table 9 (grand total average) and table 3, respectively.

APPENDIX I

Methodology for Determining Present Costs

The present costs to, through, and from wholesale facilities and the applicable volumes shown in tables 3 and 9 were based on information obtained from some or all of the firms in each commodity group. Three costs were obtained from all the firms included in this study—rent; waste, shrinkage, and deterioration; and pilferage. All costs were divided by the volume pertaining to them to obtain an average cost per ton for each cost component. Where costs were obtained for only some of the firms in a commodity group, cost per ton information was extended to the applicable volume for all the firms in the group. All costs relating to fluid milk candidates were excluded.

The percent of employees' time spent carting, unloading, handling within, loading out, transferring, and distributing was estimated by wholesalers. This information was used to determine the labor cost for each function. Labor costs for the wholesalers' employees included basic wage rates, overtime, bonuses, and fringe benefits.

To Facilities

These costs included those operations involved in moving commodities from initial points of receipt to the firms' facilities, as well as cartage and avoidable delay to trucks. All tonnages were estimated by the wholesalers.

Cartage Costs.—Cartage costs consisted of loading commodities into trucks from commercial warehouses and transporting these commodities to the firms' facilities. These costs were determined on the basis of (1) the average elapsed time and mileage per round trip, (2) the cost per mile for owning (or renting), operating, and maintaining a truck, and (3) the cost per hour for a driver (and his helper). These elements were combined to estimate the cost per load. The average tons per load were obtained from the wholesalers. The cost per ton was then derived by dividing the cost per load by the average tons per trip.

The cost per mile for owning and renting trucks depended on the type and size of the vehicle. This cost varied substantially among the different commodity groups. Truck ownership costs consisted of fixed and variable costs.

Fixed costs included depreciation, insurance, interest on invested capital, and taxes. Variable costs included gasoline, oil, and maintenance.

Avoidable Delay to Trucks.—Avoidable delay consisted of actual delay time encountered by wholesalers' trucks within the immediate area of the wholesale facility. The cost of this delay was determined by multiplying the total annual hours of delay by the hourly costs of drivers (and their helpers) and trucks. The resulting cost was then divided by the total volume handled. Delay time was estimated by wholesalers, driver interviews, and observation.

Through Facilities

The cost of handling through facilities included labor at the facilities and other costs.

Labor Costs.—These costs were based on the labor required to unload incoming railcars and trucks at the facilities, to handle products within facilities, and to load outgoing wholesalers' and buyers' trucks. Costs per ton were based on the total volume of food handled, which included the sum of direct and indirect receipts. As defined previously, the percent of employees' total labor hours (estimated by wholesalers) spent at unloading, handling within, and loading out determined the labor cost for each function. Labor costs for the wholesalers' employees included the basic wage rates, overtime, bonuses, and fringe benefits.

Unloading is defined as moving incoming products from a railcar or truck at the facilities onto the street, sidewalk, platform, facility floor or into the cooler or freezers, ripening rooms, and storage areas, as well as moving merchandise between floors. Also included was the cost of moving commodities between split facilities, which were owned or rented by one wholesaler. Processing, such as boning and breaking carcasses, repacking produce, packaging meat, and icing and re-icing boxes of poultry, was not included.

Loading out included moving merchandise from a sidewalk, facility floor, platform, overhead rail, or storage area into an outbound vehicle. If the driver participated in loading out, his labor was included in the loading-out operation. The driver's idle time spent waiting for trucks to be loaded was included in distribution costs.

Other Costs.—Costs of the following were estimated by the wholesalers or obtained from their records: Facility rental, public warehouse, handling-equipment purchase, and waste, shrinkage, deterioration, and pilferage.

Facility rental cost consisted of the annual rent paid by the wholesalers for the use of their facilities. For wholesaler-owned facilities, the annual rental value of facilities was estimated by the owners and verified by comparing the costs with those of similar facilities. The rent included facility maintenance and repairs, refrigeration equipment maintenance, real estate taxes, fire and extended insurance on building but not contents, security services, and snow removal.

Public warehouse costs were the annual costs to wholesalers for storing their food products at a public warehouse when their own facilities were unable to handle them.

Handling-equipment purchase costs were estimated by the wholesalers. Ownership costs were based on this estimate and included straight-line depreciation, interest on invested capital, and insurance. Annual maintenance charges were based on equipment manufacturers' and wholesalers' estimates.

Waste, shrinkage, deterioration, and pilferage costs consisted of the value of products lost in wholesaling operations. Reduction in the value of salvage products was included as part of the deterioration cost. Wholesalers' food products that had started to deteriorate were not included in this cost.

From Facilities

Distribution included the movement of food commodities from the wholesalers' facilities to points within the study area. The volume of food available for distribution was based on the sum of direct and indirect receipts. For purposes of studying the cost of distribution, the Wichita study area was divided into area 1 (central), area 2 (northeast), area 3 (southeast), area 4 (southwest), and area 5 (northwest). Figure 20 illustrates the boundaries.

Basic data on costs relating to distribution were obtained from a representative sample of firms associated with this study. Unless otherwise noted, all references to cost and product movement related to the sample firms.

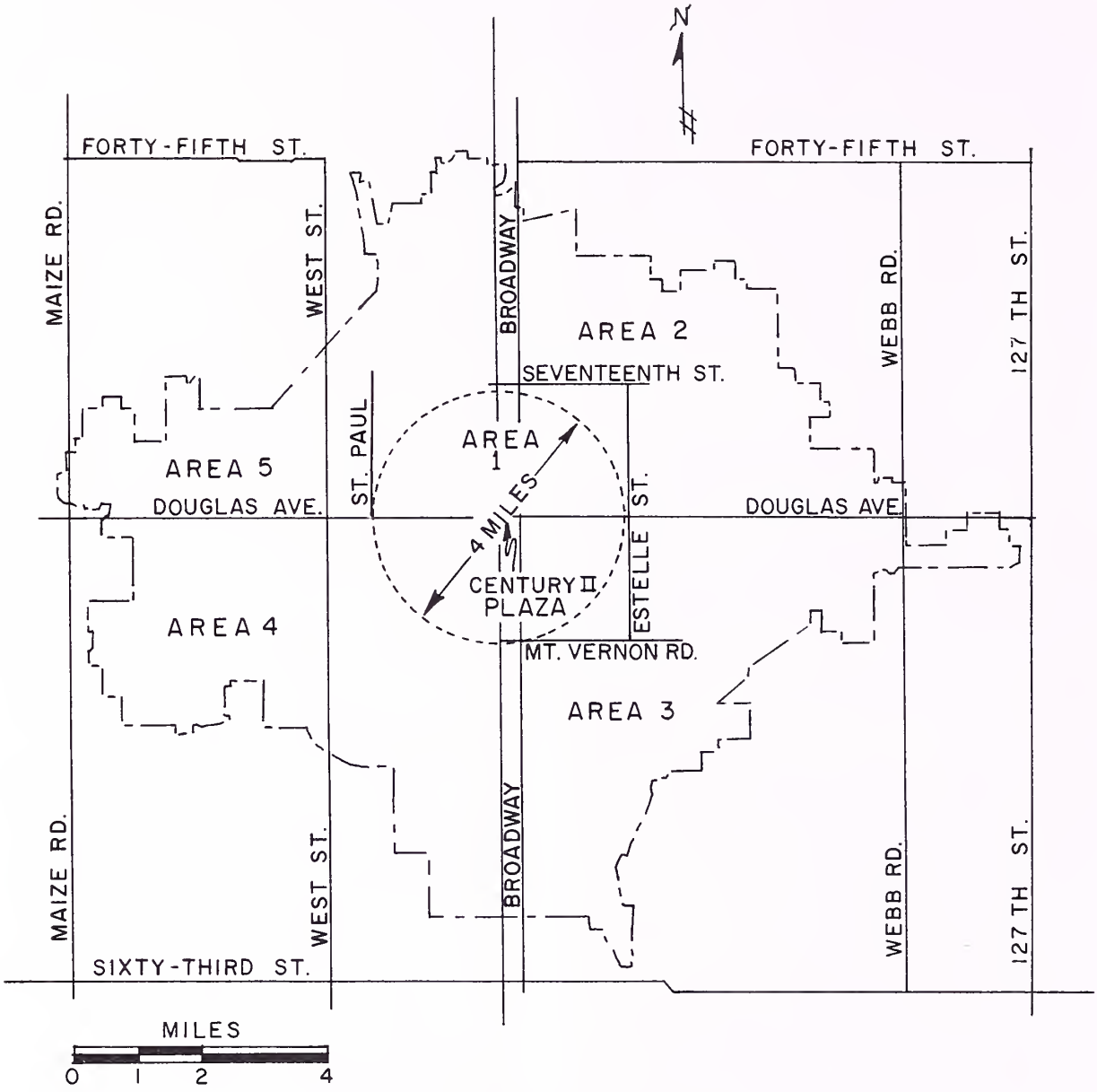

FIGURE 20.—Distribution areas for Wichita, Kans.

Information required to calculate truck ownership and operating costs was obtained from each firm. Ownership costs were calculated on a basis of a 6-year straight-line depreciation with no scrap value. Eight-percent simple interest was charged for one-half the initial purchase price to determine annual interest costs. Actual insurance costs were obtained and utilized. Operating costs consisted of actual charges for gas, oil, and maintenance. Labor costs were calculated by applying the actual wage rates, including fringe benefits, to the delivery personnel's time spent on distribution activities.

Total truck costs (ownership and operating costs) and labor costs were converted to a form suitable for subsequent calculations. Truck costs were divided by the total miles driven to determine an average per mile cost for each firm. Similarly, the total labor costs of delivery operations were divided by the time in minutes

spent on that function to calculate an average labor cost per minute for each firm. This information was applied to the time-distance data in table 11 to determine the round-trip cost per ton to each area. This partial distribution cost (round-trip cost per ton) represented only the cost of on the road movement to and from each area.

The round-trip cost per ton to each area was calculated as follows:

$$\text{Round-trip cost per ton} = \frac{[(\text{annual round-trip time in minutes})(\text{labor cost per minute}) + (\text{annual round-trip miles})(\text{truck cost per mile})]}{\text{annual tons distributed to each area}}$$

Where

$$\text{Number of trips} = \frac{\text{annual tons distributed to each area}}{\text{average tons per truckload}}$$

and

$$\text{Total round-trip time} = (\text{number of trips to each area})(\text{minutes per trip}^1)$$

and

$$\text{Total round-trip miles} = (\text{number of trips to each area})(\text{miles per trip}^1)$$

An average round-trip cost per ton was calculated for all the firms by multiplying each firm's round-trip cost per ton to each area by the volume the firm distributed to that area, totaling the products, and dividing the result by the total tonnage all the firms distributed to that area. This average round-trip cost is defined as the to-from cost per ton. The calculations resulted in a different to-from cost to each area.

The next step in the analysis was to calculate the remaining part of the distribution cost, which consisted of expenses for unloading at the customers' facilities, movement between customers, and associated delays. This part of the delivery cost was assumed to remain constant regardless of the locations of the wholesalers in relationship to their customers and is defined as the base cost. The base cost was calculated as follows:

$$\text{Base cost per ton} = (\text{total delivery cost per ton}) - (\text{overall round-trip cost per ton})$$

Where

$$\text{Total delivery cost per ton} = \frac{\begin{array}{l}[(\text{total truck operating} \\ \quad \text{and ownership cost} \\ \quad \text{for all firms}) + \\ \quad (\text{total labor cost for} \\ \quad \text{delivery by same firms})]\end{array}}{\text{total tons delivered}}$$

and

$$\text{Overall round-trip cost per ton} = \frac{\begin{array}{l}[(\text{tonnage delivered to area 1}) \\ \quad (\text{to-from cost per ton to area 1}) + \\ \quad (\text{tonnage delivered to area 2}) \\ \quad (\text{to-from cost per ton to area 2}) + \\ \quad (\text{tonnage delivered to area 3}) \\ \quad (\text{to-from cost per ton to area 3}) + \\ \quad (\text{tonnage delivered to area 4}) \\ \quad (\text{to-from cost per ton to area 4}) + \\ \quad (\text{tonnage delivered to area 5}) \\ \quad (\text{to-from cost per ton to area 5})]\end{array}}{\text{total tons delivered within 5 areas}}$$

[1] See table 11.

The total distribution cost per ton to each area was calculated by adding the to-from cost per ton to each area to the base cost per ton. Cost-per-ton information from the sample firms was then extended to include all volume moving to each area.

Methodology for Determining Proposed Costs

Except where noted, estimated proposed costs at each of the five representative sites were based on the same volume, wage rates, and procedures as were used to determine present costs. For a more detailed explanation of the following operations and the estimation of their costs, see the preceding section on determining present costs.

To Facilities

Cartage and Avoidable Delay to Trucks.—As the new center will meet the wholesalers' facility needs, no cartage charges are anticipated for receipts by way of public warehouses. Adequate streets, parking areas, and maneuvering space eliminate avoidable delay at the wholesale facilities.

Through Facilities

Labor Costs.—Labor cost estimates for unloading, handling within, and loading out in the proposed food center were based on published studies of technical handling operations and estimates by U.S. Department of Agriculture specialists. These estimates were adjusted to wage rates prevalent in Wichita in 1971.

Other Costs.—The total annual rent (or ownership) costs was based on the annual revenue required for debt service, real estate taxes, management, insurance, and repairs including upkeep. In calculating these costs in proposed facilities it was necessary to adjust the total revenue required for wholesale facilities (table 7) to exclude charges for the fluid milk facilities, as this commodity was excluded from the analysis of total selected costs (table 9).

The rents required to support the fluid milk facilities were calculated in a similar manner as the overall costs of the proposed center. First, the facility costs were determined separately (overall costs shown in appendix II). The following data illustrate these costs:

FLUID MILK

Single-occupancy facilities:	
Building[1] (2 containing a total of 48,920 sq ft of first-floor space)	$759,000
Other facilities:	
Street[2] and parking area paving	228,700
Sewers[2] (storm and sanitary)	10,800
Street[2] and parking area lighting	10,300
Fencing	10,300
Sprinkler system[3]	27,800
Total construction cost of buildings and other facilities	1,046,900
Associated construction costs:[4]	
Architect's fee	52,345
Construction loan	109,925
Contingency allowance	120,917
Total buildings, other facilities, and associated costs	1,330,087

[1] Includes cost of shell building, coolers and freezers, unit heaters, drainage and rough-in plumbing, lighting, and interior and exterior painting.

[2] Computed on pro rata basis of square feet of building space.

[3] Does not include freezer areas.

[4] These costs are estimated as follows: Architect's fee = 5 percent of buildings and facilities cost; construction loan = 10 percent of sum of buildings and facilities cost + architect's fee; contingency allowance = 10 percent of buildings and facilities cost + architect's fee + construction loan.

Table 12 illustrates the total cost of land and buildings for the two fluid milk candidates, which will require approximately 10.06 acres of land.

Next, the total revenue required to support the two fluid milk facilities was calculated. This cost is shown in table 13.

The total annual revenue required for the proposed center (table 7) is comprised of the total revenue required for the 12 candidate firms (table 9) examined in the cost analysis and the 2 dairy firms excluded from the analysis. Table 14 illustrates the components of the total annual revenue required for the entire center.

In proposed facilities, public warehouse service charges would be reduced because the wholesalers would have adequate space for normal operations. Some wholesalers would, however, need to use public warehouses to store reserve stocks or to hold items in periods of oversupply and occasional market speculation.

TABLE 11.—*Distance and time per round trip between centers of 5 Wichita distribution areas* [1]

Distance and time from—	Area 1 (central)	Area 2 (northeast)	Area 3 (southeast)	Area 4 (southwest)	Area 5 (northwest)
Area 1:					
Miles	2.3				
Minutes	8				
Area 2:					
Miles	8.6	2			
Minutes	28.9	6.9			
Area 3:					
Miles	10	10	2.5		
Minutes	27.8	28.8	7.3		
Area 4:					
Miles	10	20	10	2.2	
Minutes	22	55	25	4.8	
Area 5:					
Miles	8	12	19	10	2
Minutes	27.5	34.1	40.9	18	4.1

[1] Travel within area based on 1/2 average round-trip distance from center to perimeter.

TABLE 12.—*Estimated investment costs for land and facilities for 2 fluid milk firms at 5 proposed sites for food distribution center* [1]

Item	Bridgeport	Wichita Township	Kechi Township	Riverside	Southwest Industrial Park
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Land	85.5	153.9	30.2	45.3	422.5
Facilities	1,330.1	1,330.1	1,330.1	1,330.1	1,330.1
Total	1,415.6	1,484.0	1,360.3	1,375.4	1,752.6

[1] See table 6 for land costs at each site.

The handling equipment cost was based on the initial cost of new equipment, its estimated life, operating and maintenance costs, interest, and taxes.

In modern facilities with adequate security, cooler and freezer space, and mechanized handling equipment, it is estimated that waste, shrinkage, deterioration, and pilferage will be reduced based on estimates by commodity specialists in modern food distribution facilities of other cities.

Refrigeration costs were based on the amount of refrigeration and air-conditioning required by each wholesaler. These amounts were dependent on such factors as room dimensions, room temperature, insulation thickness, glass area, number of people working in a room, number and size of motors in a room, number of lights in a room, wall temperatures, product loads, number of doors, and door usage.

The total amount of refrigeration and air-conditioning required was estimated to be 700 tons.[2] Based on the costs of a central refrigeration system and adjusting these costs to reflect the size of the proposed refrigeration system in Wichita and the effects of inflation since that study was published, it was assumed that each ton of refrigeration has an initial cost of $1,250

[2] "Tons of refrigeration" is the measurement of the rate of heat extraction required to maintain room and product temperatures at desired levels; 1 ton of refrigeration equals 12,000 Btu per hour.

TABLE 13.—*Comparison of estimated total annual debt service payments, real estate taxes, and revenue required for 2 candidate fluid milk firms at 5 proposed sites for a wholesale food distribution center using industrial revenue bonds (IRB's) and conventional private financing*

Item	Bridgeport		Wichita Township		Kechi Township		Riverside		Southwest Industrial Park	
	IRB's	Private	IRB's	Private	IRB's	Private	IRB's	Private	IRB's	Private
	1,000 dollars		*1,000 dollars*		*1,000 dollars*		*1,000 dollars*		*1,000 dollars*	
Debt service: [1]										
Amortization	125.5	142.7	131.6	150.0	120.6	137.1	122.0	138.6	155.4	176.7
Contingency	12.6	14.3	13.2	15.0	12.1	13.7	12.2	13.9	15.5	17.7
Total	138.1	157.0	144.8	165.0	132.7	150.8	134.2	152.5	170.9	194.4
Real estate taxes: [1]										
Tax	27.0	45.0	28.3	47.2	26.0	43.3	26.2	43.7	33.4	55.7
Contingency	2.7	4.5	2.8	4.7	2.6	4.3	2.6	4.4	3.3	5.6
Total	29.7	49.5	31.1	51.9	28.6	47.6	28.8	48.1	36.7	61.3
Other costs:										
Insurance [2]	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Maintenance [3]	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Management [4]	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Contingency [5]	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Total	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8
Total revenue required	180.6	219.3	188.7	229.7	174.1	211.2	175.8	213.4	220.4	268.5

[1] See table 7 for methods of calculation.

[2] Fire, extended coverage, vandalism, and sprinkler leakage insurance calculated on basis of $0.353 per $100 of building value at 90-percent valuation. Part of total cost of leasers' liability insurance allocated to fluid milk facilities based on overall insurance cost borne by that commodity.

[3] Maintenance calculated on basis of 1/2 of 1 percent of total building, other facilities, and associated costs.

[4] Part of total $11,200-project management cost allocated to dairy facilities based on that commodity's share of total land.

[5] 10 percent of total insurance, maintenance, and management costs for dairy facilities.

TABLE 14.—*Total revenue required for 12 candidate firms and 2 fluid milk firms requiring new facilities at 5 proposed sites for a wholesale food distribution center using industrial revenue bonds (IRB's) and conventional private financing*

Total revenue required for—	Bridgeport		Wichita Township		Kechi Township		Riverside		Southwest Industrial Park	
	IRB's	Private	IRB's	Private	IRB's	Private	IRB's	Private	IRB's	Private
	1,000 dollars		*1,000 dollars*		*1,000 dollars*		*1,000 dollars*		*1,000 dollars*	
12 candidate firms [1]	1,061.4	1,289.2	1,088.2	1,321.8	1,039.5	1,262.5	1,045.5	1,269.9	1,193.4	1,451.9
2 fluid milk firms [2]	180.6	219.3	188.7	229.7	174.1	211.2	175.8	213.4	220.4	268.5
All candidate firms [3]	1,242.0	1,508.5	1,276.9	1,551.5	1,213.6	1,473.7	1,221.3	1,483.3	1,413.8	1,720.4

[1] See table 9 (rent data).

[2] See table 13.

[3] See table 7.

and an annual owning and operating cost of $340.[3] Each of these figures was multiplied by 700 tons to arrive at a total initial cost of $875,000 and an annual owning and operating cost of $238,000.

[3] STAHLMAN, R. L. A STUDY OF REFRIGERATION SYSTEM FOR URBAN FOOD DISTRIBUTION CENTERS. U.S. Dept. Agr. Agr. Mktg. Res. Rpt. 921, 107 pp. 1972.

From Facilities

The cost of distribution at proposed facilities was determined in a manner similar to the method used to determine the distribution cost in present facilities. It was assumed that all commodities were to be distributed from the area in which the representative site was located to the five distribution points.

APPENDIX II

Building Cost Data

The specific kind and amount of facilities planned for this project were based on the number of candidates, their volume, and their turnover rates. Facility costs were based on construction costs in the Wichita area for 1972. These estimates assumed tilt-up concrete construction with a 6-inch concrete floor slab. Tilt-up construction consisted of on-site casting of concrete building members—usually walls and sometimes the building frame.

Multiple- and single-occupancy building costs were estimated at $10.25 per square foot. Mezzanine space in multiple-occupancy buildings was estimated at $8.40 per square foot. Coolers and freezers were estimated at $35 and $40 per square foot, respectively. Costs were based on published construction cost data and estimates from local Wichita contractors.

The estimated costs for the multiple-occupancy facilities were for the shell building with a mezzanine, cooler or freezer or both, drainage and rough-in plumbing, lighting, interior and exterior painting, and heating equipment. Partitioned offices and specialized equipment were not included.

The estimated costs for the single-occupancy facilities, including the public refrigerated warehouse, were for the shell building with drainage and rough-in plumbing, coolers or freezers or both, interior and exterior painting, and heating equipment. Mezzanine, partitioned offices, and specialized equipment were not included.

The estimated costs for the central refrigeration plant included the shell building, lighting, interior and exterior painting, central plant equipment, refrigerant distribution lines, and terminal equipment.

Paving costs were for a 6-inch concrete base with a 2-inch asphalt running course. For areas with oil or gasoline drippings, such as parking areas and driveways, 6 inches of concrete paving without the asphaltic covering are recommended because of the detrimental effect petroleum products have on asphalt. Solid concrete paving is also needed in these areas to support disengaged trailers.

The total construction costs also included rail trackage, switches, storm and sanitary sewers, street lights, fencing, and sprinkler systems. All utility lines were assumed to be underground.

Rates used for the architect's fee (5 percent), the construction loan (10 percent), and the contingency allowance (10 percent) were those charged for this type of construction.

These estimated construction costs are not intended to replace firm estimates by local architects and contractors and should be considered only for illustrative purposes.

The following data show the estimated costs for the proposed facilities:

WHOLESALE FOOD FACILITIES

Multiple-occupancy facilities:	
Buildings[1] (eight 30- by 100-ft units, including 1 unit as a restaurant)	$532,900
Other facilities:[2]	
Railroad trackage and switches	23,300
Street[3] and parking area paving	121,600
Sewers[3] (storm and sanitary)	5,200
Street[3] and parking area lighting	6,500
Fencing around building	6,700
Sprinkler system[4]	14,000
Total construction cost of buildings and other facilities	710,200
Associated construction costs:[5]	
Architect's fee	35,500
Construction loan	74,600
Contingency allowance	82,000
Total buildings, other facilities, and associated costs	902,300
Single-occupancy facilities:	
Buildings[1] (8 containing 326,545 sq ft of first-floor space)	5,601,400
Other facilities:[2]	
Railroad trackage and switches	72,400
Street[3] and parking area paving	680,600
Sewers[3] (storm and sanitary)	71,900
Street[3] and parking area lighting	47,700
Fencing around building	36,300
Sprinkler system[4]	169,300
Total construction cost of buildings and other facilities	6,679,600
Associated construction costs:[5]	
Architect's fee	334,000
Construction loan	701,400
Contingency allowance	771,500
Total buildings, other facilities, and associated costs	8,486,500
Total investment cost for wholesale facilities	9,388,800

See footnotes at end of tabulation.

PUBLIC REFRIGERATED WAREHOUSE

Single-occupancy facilities:	
Building (1; 46,255 sq ft)	$1,849,000
Other facilities:[2]	
Railroad trackage and switches	27,000
Street[3] and parking area paving	94,500
Sewers[3] (storm and sanitary)	10,200
Street[3] and parking area lighting	7,000
Fencing around building	5,100
Total construction cost of building and other facilities	1,992,800
Associated construction costs:[5]	
Architect's fee	99,600
Construction loan	209,200
Contingency allowance	230,200
Total building, other facilities, and associated costs	2,531,800

CENTRAL REFRIGERATION PLANT

Single-occupancy facilities:	
Building and equipment (one 3,600-sq ft building)	$875,000
Other facilities:[2]	
Street[3] and parking area paving	7,400
Sewers[3] (storm and sanitary)	800
Street[3] and parking area lighting	500
Fencing around building	400
Sprinkler system[4]	2,200
Total construction cost of building and other facilities	886,300
Associated construction costs:[5]	
Architect's fee[6]	2,800
Construction loan[7]	88,900
Contingency allowance[7]	99,200
Total building and equipment, other facilities, and associated costs	1,077,200
Total estimated investment cost for all proposed facilities	12,997,800

[1] Includes cost of shell building, coolers and freezers, unit heaters, drainage and rough-in plumbing, lighting, and interior and exterior painting.

[2] The cost of "other facilities" is as follows:

(1) *Trackage.*—$17 per linear foot.

(2) *Rail Switches.*—$2,500 per switch.

(3) *Paving.*—Streets have 6-inch concrete base with 2-inch asphalt running course at $10 per square yard. Parking areas and driveways around buildings have 6 inches of concrete at $8.40 per square yard.

(4) *Sewers.*—12-inch sanitary sewers at $10 per foot and 18-inch storm sewers at $18 per foot.

(5) *Fencing.*—9-gage woven wire fence, 6 ft high with 3 strands of barbed wire totaling 7 ft high, at $3.50 per linear foot. Gates are $10 per linear foot of width.

(6) *Sprinkler Systems.*—$0.62 per square foot; does not include freezer areas.

(7) *Street Lighting.*—$700 per light; 1 light will suffice for 80- by 150-ft area.

[3] Computed on pro rata basis of square feet of building space.

[4] Does not include freezer areas.

[5] These costs are estimated as follows: Architect's fee = 5 percent of buildings' and facilities' cost; construction loan = 10 percent of sum of buildings' and facilities' cost + architect's fee; contingency allowance = 10 percent of buildings' and facilities' cost + architect's fee + construction loan.

[6] Architect's fee for central refrigeration plant did not include cost of equipment. Cost of building alone was estimated at $45,000, which was added to cost of "other facilities" for total of $56,300, on which architect's fee was based.

[7] These costs are based on cost of building, equipment, and "other facilities."

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